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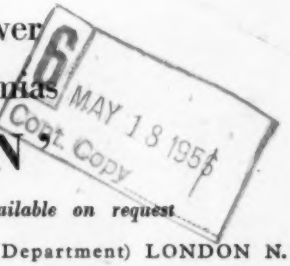

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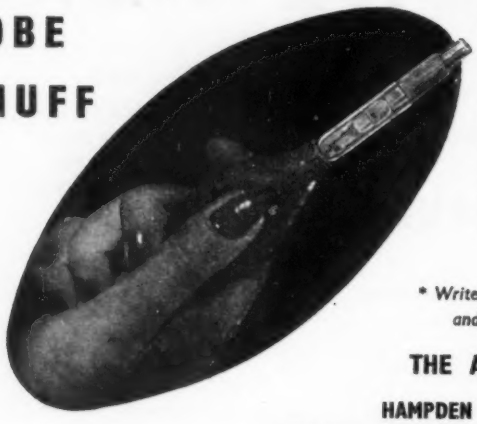

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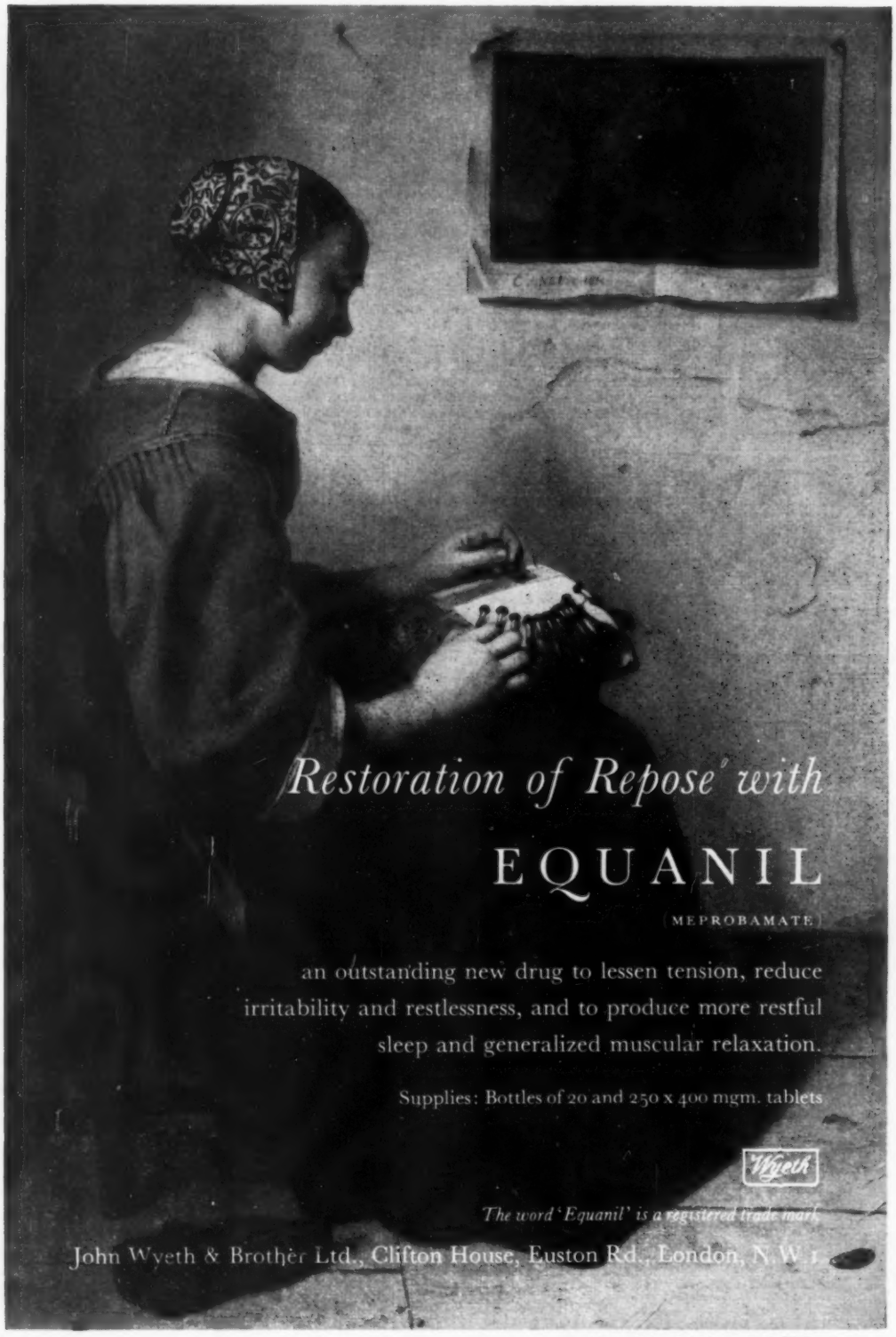
Restoration of Repose with
EQUANIL
MEPROBAMATE
an outstanding new drug to lessen tension, reduce irritability and restlessness, and to produce more restful sleep and generalized muscular relaxation.
Supplies: Bottles of 20 and 250 x 400 mgm. tablets
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The word 'Equanil' is a registered trade mark
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Is it going to hurt?

There are many wounds of all types which require dressing in such a way that the delicate epithelium receives the minimum of trauma. Most burns and many of the lesser accidents to which children are subject come into this category.

In such cases, consider the advantages of Jelonet paraffin gauze dressing. This non-adherent dressing, a Smith & Nephew product, comes to you sterilized for immediate use in your surgery. It need exert no more pressure over the damaged part than is absolutely necessary; dressing trauma is prevented, and healing can continue undisturbed.

Jelonet dressings are supplied in tins and in separately-packed single pieces, in sealed envelopes, for use in the patient's home.

JELONET

YEARS MARK

PARAFFIN GAUZE DRESSING B.P.C

is a dressing for all wounds — sterile and ready for immediate use

Jelonet may be prescribed on Form E.C.10 in the following sizes: — individual pieces in separate envelopes, in cartons of 12, and in tins containing 5, 10 and 36 pieces. Each piece $3\frac{1}{4}$" x $3\frac{1}{4}$".
For hospitals and other large users there is a special tin containing a strip 8 yds. long x $3\frac{1}{4}$" wide zig-zag folded. Every dressing is sterilised and ready for immediate use.

FULL DETAILS FROM SMITH & NEPHEW LTD · WELWYN GARDEN CITY

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No need to be a strong man . . .

. . . to inject 'AVLOPROCIL' A.S.

(Aqueous Suspension)

Procaine Penicillin G B.P.

One of its many advantages is its ability to pass through a narrow needle without blockage.

Available in multi-dose containers of 5 c.c. and 10 c.c.

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A subsidiary company of Imperial Chemical Industries Limited

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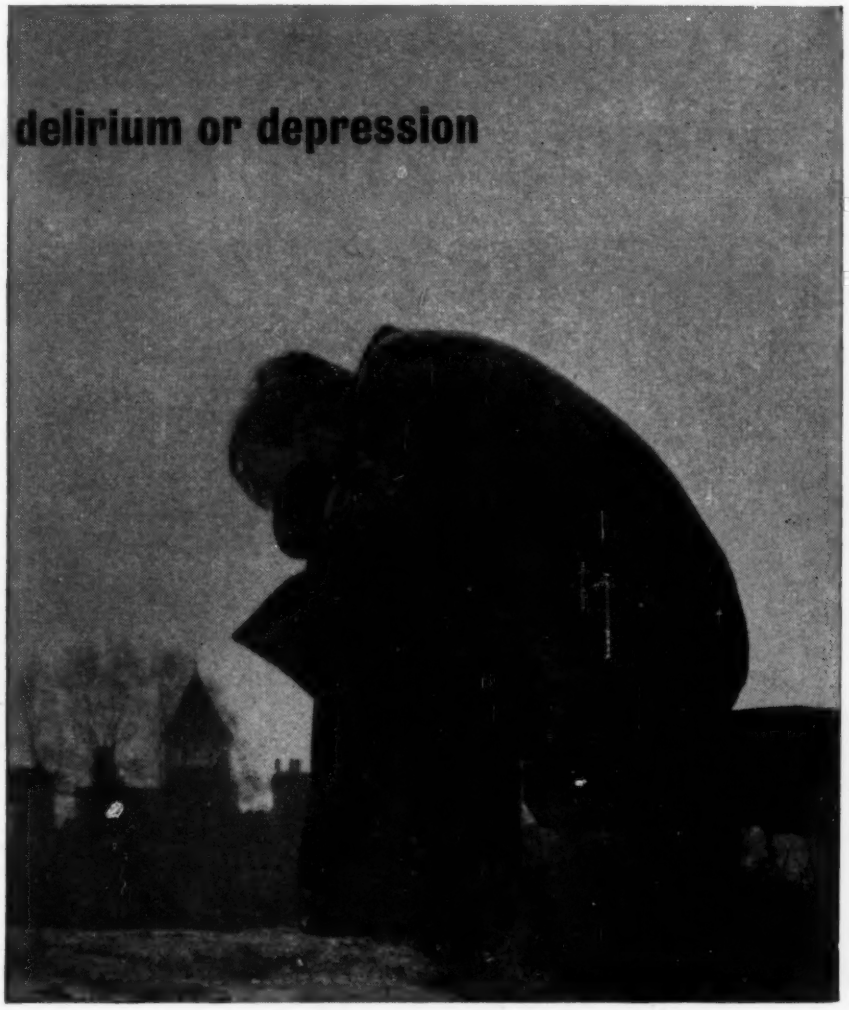
In coma, delirium or depression



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Injectable B-Complex with vitamin C

Restores normal cerebral function in toxic states due to narcotic or barbiturate drugs, alcohol, or acute infections.

In Boxes of 3 pairs of ampoules. *Hospital pack also available.*

Two groups of preparations containing the vitamin B complex in less massive concentration are: **BECOVITE & BEFORTISS.** The B complex in Tablets, Ampoules and Elixirs.

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SHOCK AFTER BURNS

THIS PATIENT has been badly burned. Plasma is being lost, with a consequent reduction in the colloidal osmotic pressure of the blood.

COLLOID must be infused if blood volume is to be maintained.

A CLEAR CASE FOR DEXTRAVEN, the optimal fraction dextran.

DEXTRAVEN raises the blood pressure swiftly and surely. Loss by renal excretion is minimal and most of what is infused stays in the circulation for at least 24 hours.

DEXTRAVEN can be given immediately by intravenous infusion. Stable indefinitely under all climatic conditions, it requires no special storage precautions.

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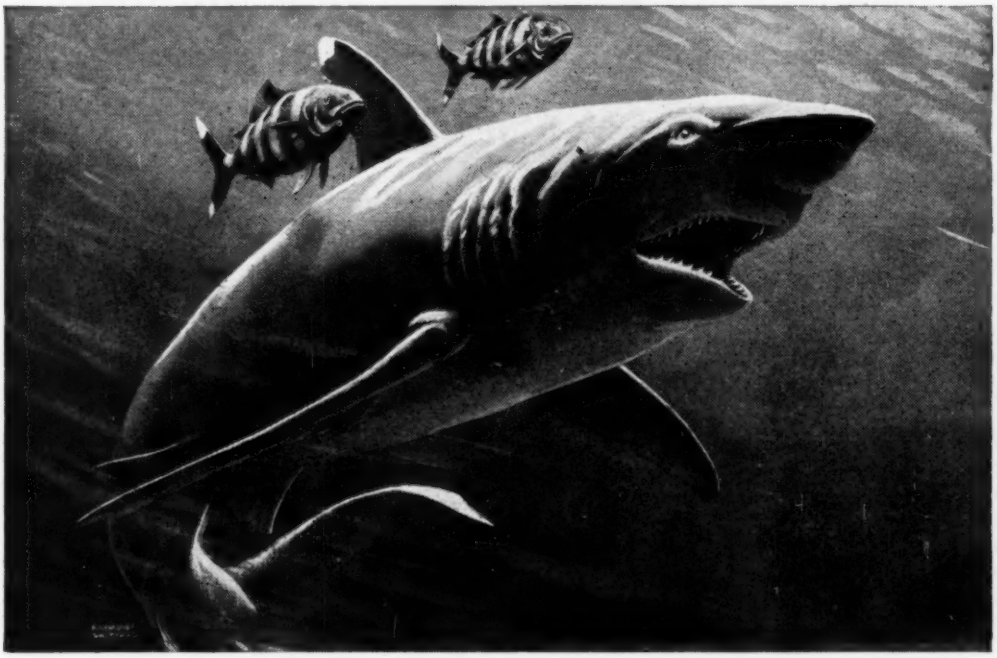
An unusual degree of tolerance....



PILOT FISH. *These swift, gaily marked oceanic fish have long been known as escorts of sharks and whales, apparently to feed upon fragments of prey discarded by the monsters. The ancients believed that pilot fish directed sharks towards their victims, and this would probably account for the unusual tolerance of these fierce hunters towards their smaller neighbours.*

WELL tolerated by patients undergoing long-term aspirin therapy in rheumatic conditions; easily taken by those who are nauseated by crushed or dissolved aspirin, or who cannot swallow tablets, Paynocil presents aspirin in its most acceptable form.

Gastroscopic investigation has shown Paynocil to be superior to aspirin tablets in not causing inflammation of the gastric mucosa, a constant danger with prolonged treatment. Paynocil tablets are equally suitable for occasional analgesia.

They disintegrate pleasantly and rapidly on the tongue without water.

Each tablet contains
Acetylsalicylic acid ..... 10 grains
Amino-acetic acid ..... 5 grains

PRESENTATION
Tubes of 18.
Dispensing pack of 240
(Basic N.H.S. cost) ..... 21/8d.

REFERENCES
Practitioner, 173: 46, 1954. Brit. med. J., 2: 7, 1955.
Ibid., Editorial, 2: 31, 1955.

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NON-IRRITANT, PALATABLE ASPIRIN

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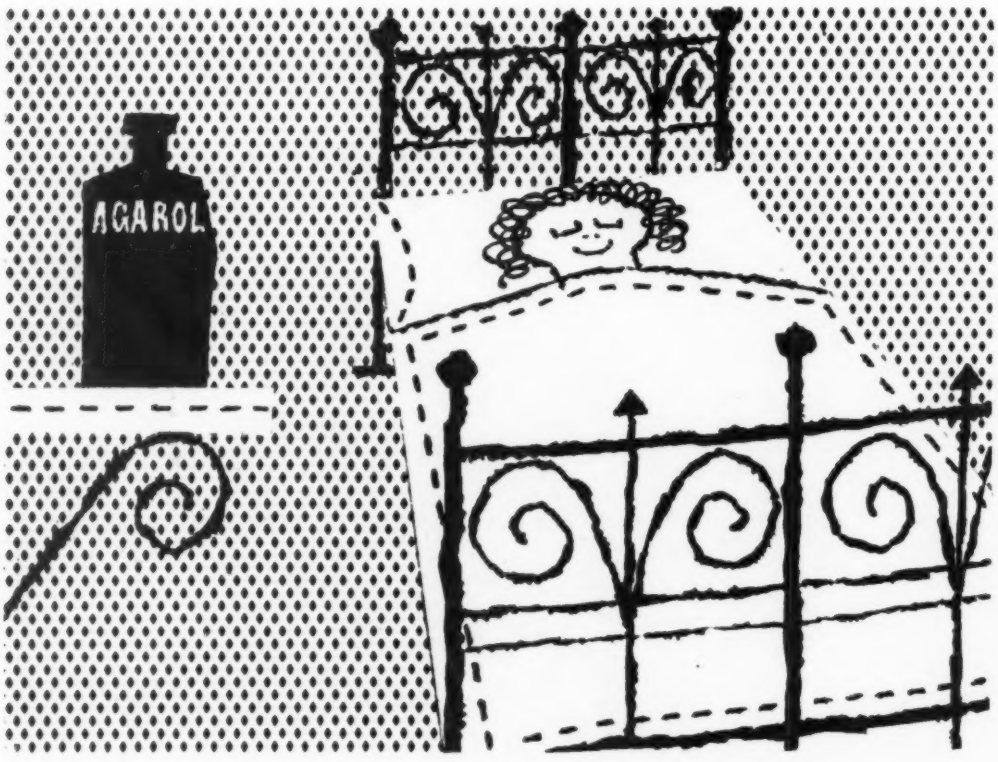
Telephone ELGar 6681 *Telegrams: Bencarlond, Harles, London*



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Active Constituents: Highly emulsified mineral oil; agar; pure white phenolphthalein.

Packing: Agarol is available in bottles of 6 and 14 fl. oz. Dispensing bottle of 80 fl. oz. supplied to chemists.

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ELECTRIC BLANKET in the TUBE

FINALGON Regd. Trade Mark
OINTMENT

Produces a glowing feeling of warmth
which lasts for hours
and relieves rheumatic pain

Tube of 20 g.

COMPOSITION :
Nonylic acid vanillylamide 0.4% and
Nicotinic acid-β-butoxyethyl ester
2.5% in a suitable ointment base
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Sleep... **the healer**

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CARBRITAL

for all types of insomnia

available in bottles of 25 and 250 capsules

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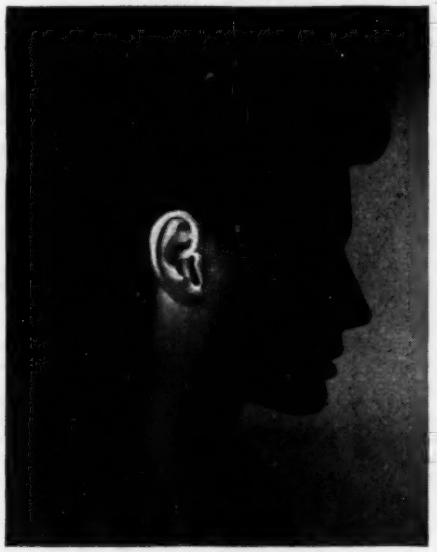
94

16

EAR WAX

Removed this easy way



The removal of wax from the external auditory meatus has, in the past, normally entailed attendance by the patient for diagnosis and for the prescription of a suitable loosening agent, and a second attendance a few days later for syringing. Now, by the use of Cerumol Ear Drops, wax can be removed in most cases at one visit. A few drops of Cerumol can be instilled into the ear and, while another patient is being attended to, the soft cerumen dissolves and the harder wax disimpacts. The wax can then be removed by gentle syringing or with cotton wool. The wax may even be found to run out of the ear on its own accord, in which case patients themselves may instil Cerumol at home, obviating further attendances. Cerumol is anti-bacterial, non-irritating and harmless to the lining of the external auditory meatus or the tympanic membrane. Cerumol is included in Category No. 4 of the M.O.H. classified list and may be prescribed on N.H.S. Form E.C.10.

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for the easier removal of wax

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PACKS for Surgery Use : 10 c.c. vial — separate dropper included. (Basic N.H.S. price 2/8.) For Hospital Use : 2 oz. and 10 oz. bottles.

Drip therapy without a tube

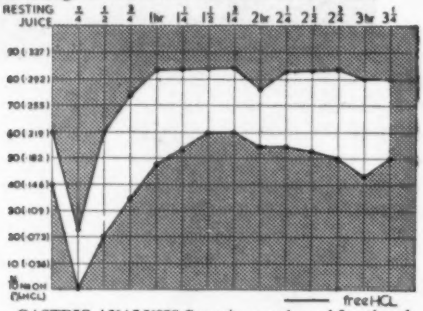
NULACIN

In the past, the successful treatment of many cases of peptic ulceration demanded hospital conditions. Now, by means of Nulacin Tablets, it is possible to control gastric hyperacidity without any inconvenience to the patient. By using Nulacin Tablets as directed, an ambulant patient can obtain all the advantages of intragastric milk-alkali drip therapy.

INDICATIONS

NULACIN tablets are indicated whenever neutralization of the gastric contents is required: in active and quiescent peptic ulcer, gastritis, gastric hyperacidity.

Beginning half-an-hour after food, a NULACIN tablet should be placed in the mouth and allowed to dissolve slowly. During the stage of ulcer activity, up to three tablets an hour may be required. For follow-up treatment, the suggested dosage is one or two tablets between meals.



GASTRIC ANALYSIS Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer

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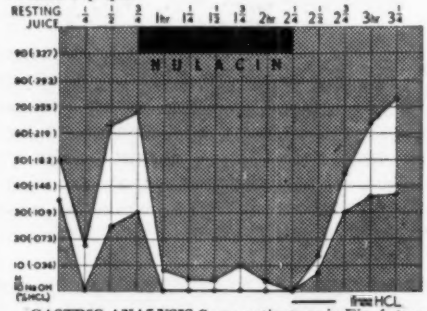
Antacids in Peptic Ulcer, *The Practitioner*, January 1956, **176**: 103

NULACIN tablets are not advertised to the public, have no B.P. equivalent, and may be prescribed on E.C.10. The dispensing pack of 25 tablets is free of Purchase Tax. (Price to pharmacists is 2/-.) Also available in tubes of 12.

NULACIN tablets are prepared from whole milk combined with dextrins and maltose, and incorporate Magnesium Trisilicate 3.5 grs.; Magnesium Oxide 2.0 grs.; Calcium Carbonate 2.0 grs.; Magnesium Carbonate 0.5 grs.; Ol Menth. Pip q.s.



GASTRIC ANALYSIS Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued

***NULACIN** is available throughout the British Commonwealth, in the U.S.A., and many other countries. It is known as NULACTIN in Canada and Sweden.*

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Pharmaceutical Division
Slough, Bucks.

Hematrix

Hæmorrhoidal Ointment Prescribable on E.C.10

For the treatment of haemorrhoids, pruritus ani and painful inflammatory and eczematous lesions of the skin in the anal region. HEMATRIX is designed for the immediate relief of itching and localised pain through progressive treatment of the enlarged and varicose tissues by mild antacid astringent action. HEMATRIX acts promptly, effectively and thoroughly, promoting the disappearance of subjective symptoms. HEMATRIX contains as active ingredients: Benzocaine 6%. Alum. Oxide 7.5%, Zinc Oxide 15%. Bals. Peruv. 2.5%, in a suitable emollient vehicle. Presented in tubes complete with extension introducer for internal application.

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NAPHTHIONIN A haemostatic of general action for administration by the parenteral route; used pre-operatively or post-operatively.
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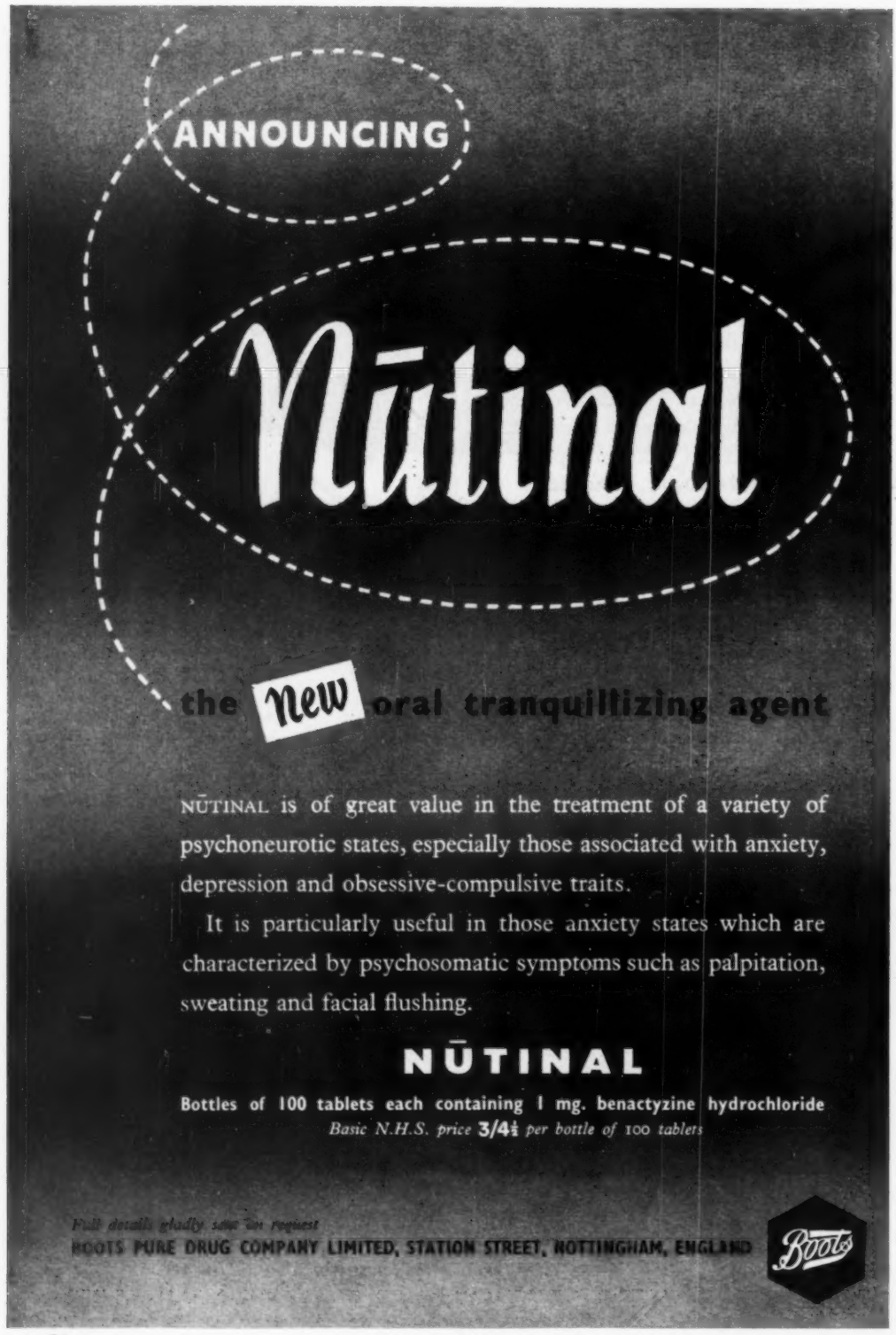
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and they shake their heads at everything,

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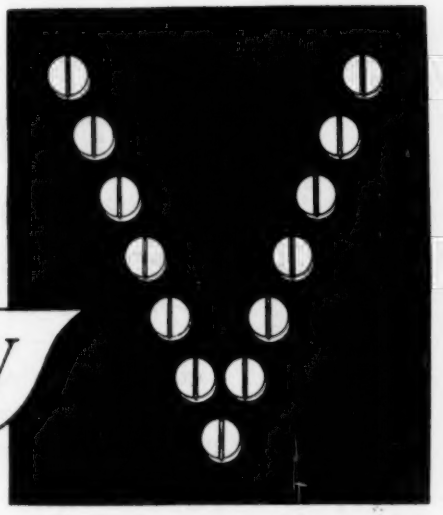

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'Distaquaine' V reduces the number of cases requiring treatment by injection

'DISTAQUAINE' V TABLETS, containing phenoxymethylpenicillin, are the first oral penicillin preparation to offer a reliable alternative to parenteral penicillin therapy.

Being acid-stable, this new form of penicillin is not affected by the gastric acidity of the individual patient and, with its quicker and more efficient absorption, produces a more consistent therapeutic effect than is possible with many other preparations. Reliable oral therapy, therefore, can be achieved with smaller doses, and a consequent reduction in the cost of treatment.

60 mg. tablets; bottles of 30.
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The outstanding advantage of this combined prophylactic—in buffered saline—is that, being without mineral carrier, it produces *minimal local reactions.* Three injections of this preparation yield a virtually 100% Schick conversion rate.

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Each dose (1 c.c.) contains :

Purified Diphtheria Toxoid (Formol Toxoid)	25 Lf. Units
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* *Diphtheria-Tetanus-Pertussis Prophylactic is prepared in the Wright-Fleming Institute of Microbiology, St. Mary's Hospital Medical School, London, W.2.*

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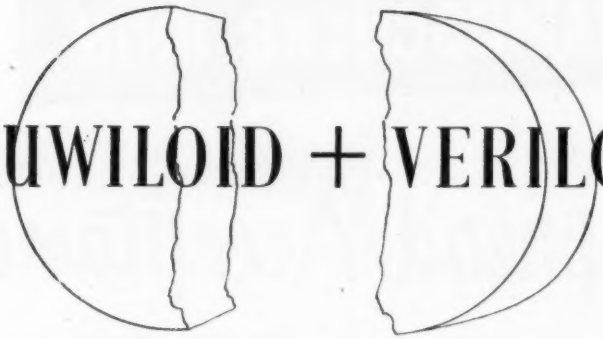
in one tablet



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"*The addition of Rauwiloid makes Veriloid easier to administer and practically does away with unpleasant side reactions*". Amer. J. Med. (1954), **17**: 629.

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"In every patient a satisfactory rise in the haemoglobin took place."[3]

"....all the patients in the series developed a vigorous sense of well-being which contrasted very strikingly with their previous chronic ill-health."[3]

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1. LANCET, 1954, 2, 942. 3. B.M.J., 1954, 2, 1255.
2. B.M.J., 1954, 2, 1257. 4. LANCET, 1954, 2, 1245.

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IT PROVIDES the rapid, reliable response of an order hitherto only obtainable with intravenous preparations; and it takes much less time to administer.

IMFERON is indicated for the patient who is refractory to, or intolerant of, oral iron; and when a rapid response is required, as in anaemia of pregnancy.

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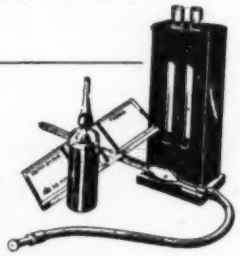

AMPOULES *2 ml. (100 mg.Fe) boxes 10 and 100*
AMPOULES *5 ml. (250 mg.Fe) boxes 5 and 50*

Fully-descriptive literature, including dosage Calculator, on request. A Technical Information Service is at your disposal.

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Pre-eclamptic Toxaemia

Toxaemia is still a major obstetrical complication and early clinical signs of the condition are often associated with increased retention of water and sodium. DIAMOX acetazolamide is not only a powerful diuretic, but it also increases sodium excretion. Recent tests show that DIAMOX with a low salt diet significantly decreases the symptoms of pre-eclamptic toxaemia.[1, 2] Reports also show that in early toxaemia and hypertensive vascular disease, DIAMOX improves the condition, as indicated by loss of weight, reduction of oedema, decrease of albuminuria and a fall in blood pressure. In these trials, side reactions have been negligible and no effect on foetal viability has been observed.

1. *Lancet* (1955) ii, 1223.
2. *North Carolina Med. J.* (1955) 16, 4, 130.

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For oral administration :
DIAMOX Tablets of 250 mg. (scored).
Bottles of 25, 100 and 1000.

Where oral use is impracticable :
DIAMOX Sodium Parenteral 500 mg.
Vials of 500 mg.

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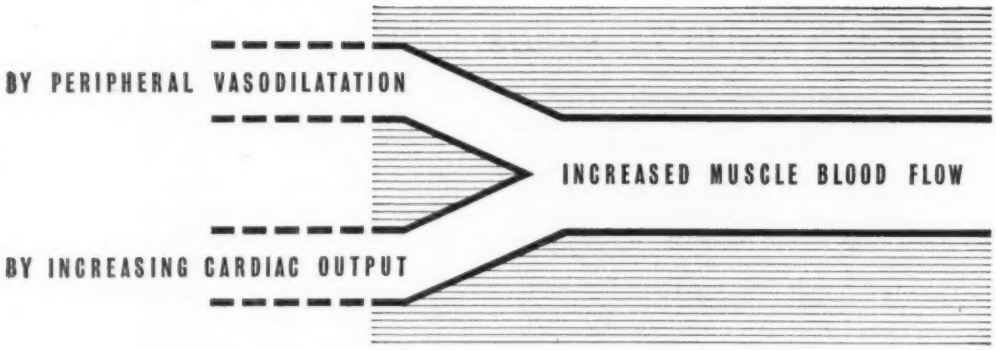
increases muscle and skin blood flow in two ways



PERDILATAL has a two-fold action. It causes a dilatation of peripheral blood vessels, ensuring a preferential increase in muscle blood supply. At the same time the cardiac minute volume is increased; systolic pressure is maintained, diastolic pressure falls; mean arterial pressure is kept constant. This combination of vasodilatation and increased cardiac minute volume results in a considerable increase in muscle blood flow and a slight increase in cutaneous blood flow.

Indications : peripheral vascular disorders : intermittent claudication, arteriosclerosis; hypertension, rheumatic conditions.

Toxicity : low.

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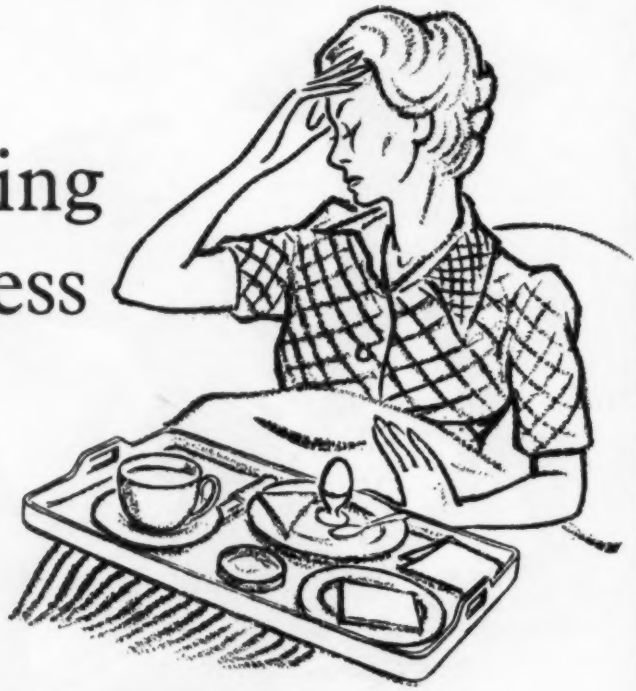

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OSTEO-ARTHRITIS

AN APPROACH TO SURGICAL TREATMENT*

J. TRUETA

M.A., M.D., D.Sc. Oxfd, F.R.C.S., F.R.F.P.S., F.R.C.S.(C.)

NUFFIELD PROFESSOR OF ORTHOPÆDIC SURGERY IN THE UNIVERSITY OF OXFORD

THE findings reported here have been collected during the last four years or so and refer to the condition known in this country as osteo-arthritis and in others as arthrosis. This is, together with poliomyelitis, the most common of the severe disorders (other than the traumatic) for whose treatment the orthopædic surgeon is responsible. One can foresee the day when paralytic poliomyelitis will rank with the other diseases—such as chronic osteomyelitis, skeletal tuberculosis, and rickets—which formerly constituted great orthopædic problems but are now becoming rare; but there has been nothing to raise our hopes of any early control of osteo-arthritis. We are still in the unhappy situation of being forced to observe the progressive deterioration of the joint until, in many cases, it is sufficiently advanced to justify a major operation, for all lesser treatments so far attempted —lactic-acid and other intra-articular injections, cortisone, physiotherapy, hydrotherapy, and radiotherapy—have only too often failed to bring permanent relief.

The present investigation was undertaken in the hope of learning something of the pathological changes in the early stages of the disease. The main results of this work have already been published (Harrison et al. 1953, Trueta 1953, 1954), but since then I have gathered new facts from further experiments

Weight-bearing and Osteo-arthritis

The main conclusions already reported referred to the relationship between osteo-arthritis and gravitation. We found that the factor chiefly responsible for the initiation of the degenerative changes is the wrong distribution of intra-articular pressures, which enabled us to explain why, in order of severity and frequency of occurrence, the spine, the hip, and the knee follow close to each other, with the ankle much less commonly affected. Another finding was that the disorder begins always in the cartilage, which, when it degenerates, is profusely invaded by vessels coming from the underlying areas of bone. This vascular proliferation is responsible for changing the cartilage of the non-weight-bearing area into bone (osteophyte) and also for weakening the resistance of the bone in the weight-bearing area. Here the orientation of the trabeculæ permits an exact appreciation of the line of gravitation and thus of the exact position in which the femur is, or was, held during life. An explanation will be offered later of the mechanism underlying the reorientation of the trabeculæ which follow the lines of gravitation and increase the resistance of the bone.

In the head of the femur the weight-bearing area which is submitted to increased direct pressure by the loss of the resilience and elastic protection of the cartilage begins to crumble away. The bone thickens and acquires the radiological characteristics known as sclerosis or bone condensation. The sclerosed area is cone-shaped with the base of the cone on the surface of the bone and its vertex directed towards the centre (fig. 1). It is an area of higher vascularisation and not of ischæmia as is commonly believed (fig. 2). Nevertheless in the midst of this profuse vascularity and robust bone structure we find the so-called bone cysts that contain fibrous, devitalised, and sometimes even amorphous tissue.

Orientation of Bone Trabeculæ

Both in the initial hypothesis and in the course of our work we suspected that the whole disorganisation of the joint, including the vascular reaction leading to either bone atrophy or bone proliferation, was due to the inability of the cancellous bone to discharge its structural requirements once the hyaline cartilage had lost its resilience and elasticity.

In higher animals and in both primitive and contemporary man evolution is evident in the type and direction of gravitational trabeculæ of the femoral head and neck. In the gorilla the trabeculæ run, like the folds of an open fan, towards all areas of the head (fig. 3); the same is found in a human child up to the age of 6 or 7 years. In Neanderthal man we find the trabeculisation similar to that of a present-day boy aged 14 or 15 (fig. 4), but in mature contemporary man the trabeculæ are concentrated towards the upper part of the head, the area which usually takes the weight in the standing position and also suffers the impact of the locking of the joint. The ontogenic changes in man repeat here the phylogenic evolution. We have acquired the ability of locking the hip-joint in full extension—an ability which was not possessed by primitive man or by the apes (fig. 5).

Apart from any contribution which endocrine or infectious disorders could make to early degeneration of the cartilage, osteo-arthritis seems to be connected with the abnormal distribution of pressures within the joint. The part of the cartilage which has not taken weight

* The Hugh Owen Thomas lecture, 1955, delivered at the Liverpool Medical Institution on Oct. 5, 1955.

Fig. 1—Section of osteo-arthritic femoral head showing triangular shape of area of sclerosed bone corresponding to weight-bearing zone and osteophytes of non-weight-bearing zone. Sclerosis is conic in shape in unsectioned head.

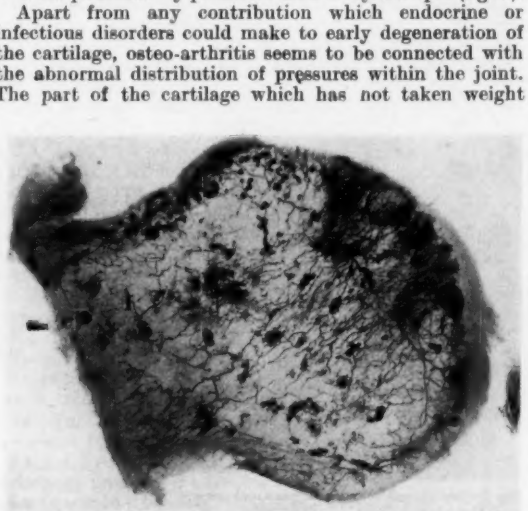


Fig. 2—Highly vascular area almost exactly corresponding to zone of sclerosed bone.

Fig. 3—Radiographs of (A) section and (B) whole of femoral head of gorilla, showing gravitational trabeculæ radiating towards whole surface of head.

degenerates earlier than that which is in current use during movement of the joint. This view, which seems somewhat mechanical, is nevertheless essentially biological. As a consequence of our more recent experiments we can suggest why the trabeculæ are shaped and reshaped and how they come to lie in the best position to carry the load of gravity and to bear other articular stresses.

Organisation of Bone

In 1870 Julius Wolff described the ability of the spongiosa to orient its trabeculæ along the lines of force of mechanical tension and pressure. That seems to have been the first expression of the relation between function and form in the living body. His concept was confirmed by Roux (1885), and both Wolff and Roux established that pressure leads to the formation of bone. This was contrary to the belief of von Volkmann (1862), who thought that pressure caused bone to atrophy. Colmann (see von Meyer 1876), a mathematician, called medical attention to the similarity between the arrangement of the cancellous architecture of the femoral neck and that of a crane constructed on the principles of higher efficiency.

However diverse the conclusions reached by many workers, there are some important points on which the majority agree, among them that the thickening of the cortical bone at the middle of the shaft corresponds to a region of danger, as happens in a bent beam at the point where the trajectories are closer to each other.

Fig. 4—Radiograph of femoral head and neck of Neanderthal man (from O. Walkhoff's "Studien über die Entwickelungemechanik des Primatenskelettes," Wiesbaden, 1904).

Benninghoff (1927) found that osteone arrangement of the compact bone is a continuation of the trabeculæ of the cancellous bone. A detailed study of the compact bone constituting the calcar femorale shows that this most dense of the cortical bones is formed by the pressing together of the great number of trabeculæ that come down from the head of the femur.

In 1920 Jores pointed out that the pressure is not always a stimulus but may be, on the contrary, often responsible for the reabsorption of bone. He thought it was all a question of the amount and duration of pressure. Scaglietti (1930) reported that an excess of pressure transmitted through the epiphyseal cartilage produces not a decrease in the thickening of the cartilage but an increase, together with a reduction in the growth-rate. No satisfactory reason had been given for the factors involved in this "inhibition."

It does not seem plausible to use in biology such terms as vulnerability, suspectability, inhibition, &c., all expressions that refer to, but do not explain, the real factors determining tissue behaviour. In search of the explanation of this mysterious behaviour of bone and cartilage in transmitting the joint stresses, I made some experiments, at first with Mr. J. D. Morgan and later with Dr. A. Trias, and the results are cited here.

We already had evidence from cases of osteo-arthritis that, when excessive pressure was transmitted through articular bone which was poorly protected, or totally unprotected, by cartilage, trabeculæ appeared with the central laminæ dead but surrounded by new living lamellæ. We had suspected that, under the action of excessive pressure through the trabeculæ, the canalicular spaces by which the osteocytes are nourished were compressed and caused the death of the osteocytes even without requiring a miniature fracture of the trabeculæ. The death of the trabeculæ seems to make an immediate appeal to the nearby vessels, which proliferate directly towards the dead laminæ and cover them by new lamellæ whose origin seems clearly vascular. These findings seem to support Levander's (1938) hypothesis, which attributes to dead bone an osteogenetic action.

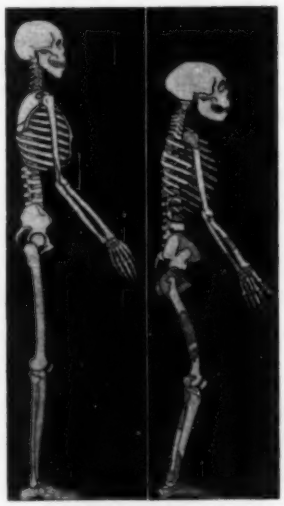


Fig. 5—(a) Erect posture of modern man with hip and knee joints firmly locked in hyperextension, and (b) semiflexed position of both joints in primitive man.

Changes Caused by Pressure

In our experiments on rabbits we used an apparatus based on Charnley's device for compression arthrodesis (fig. 6). The knee of a growing rabbit was placed within the compressing frame, with one of its pins across the distal part of the femoral metaphysis and the other through the upper part of the tibial metaphysis. As soon as it was noted that the animal tended to flex the knee to reduce the distance between the pins and thus the pressure across the knee a plaster slab or a complete plaster cast was added to prevent the leg from being moved. In a few rabbits flexion took place at the joint either in spite of the splintage or because it had purposely

been allowed to take place. Some young rabbits, permitted to survive long enough, showed a progressive tendency to deformity of the knee caused by the early closure of part of one or other of the compressed epiphyseal cartilages. In contrast to previous studies on the effect of pressure on the epiphyseal cartilage, we placed also the joint in the compressed area so that we could plot the joint changes against those of the epiphyseal cartilage.

In a previous investigation (now in the course of publication) we had found that, if the blood supplying the metaphyseal side of the plate, or part of it, was interrupted, the layers of hypertrophic cartilaginous cells multiplied until often they were more than double the number of those of the normal cartilage (fig. 7). The explanation is that blood is essential for the transformation of the cartilaginous columns of cells into bone, and

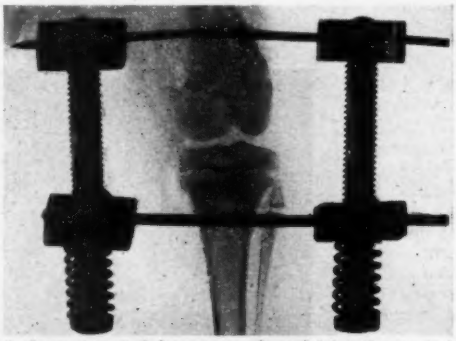
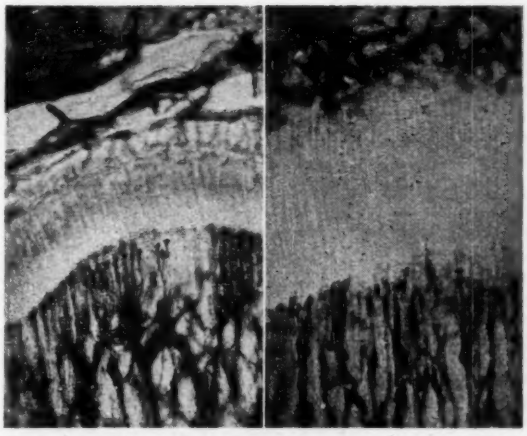


Fig. 6—Apparatus used for compression of joint tissues, including epiphyseal plates, in growing rabbits.

in its absence these cells remain cartilaginous while new ones are added to the columns by the division of the basic layer at the epiphyseal end of the column. When blood was allowed to penetrate the previously ischæmic area of the metaphysis, normal bone in its preliminary form appeared and the thickness of the cartilage was reduced to normal. This tendency to recovery of the metaphyseal side of the growing cartilage was not paralleled by the



a b

Fig. 7—(a) Normal epiphyseal plate with characteristic vascular loops; (b) metaphyseal blood-flow has been substantially decreased by interposition of a polyethylene sheath.

cells of its epiphyseal side when submitted to an ischæmia of the same duration (fig. 8). Then the ischæmic cartilage degenerated irreparably, and no further ossification took place when the blood was allowed to reach anew the ischæmic zone.

These experiments show that the behaviour of the epiphyseal cartilage depends largely on the rate of blood-flow near the two ends of its columns of cells. Consequently the joint changes to be described here, obtained under the stress of persistent excessive pressure, if taking place together with the above-described alteration of the growing cartilage, can also be attributed to defective blood-flow. A few examples may suffice to show that this is so. Following exactly the line of maximum pressure between the two transverse pins, we find in strict order advancing from the shaft towards the joint space (fig. 9) (*a*) the increase in thickness of the growing cartilage; (*b*) above it some sclerotic thickened

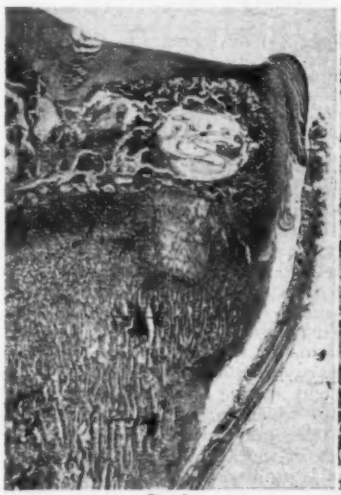


Fig. 8

Fig. 9

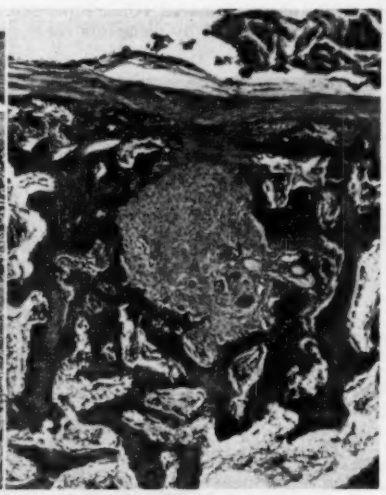


Fig. 10

Fig. 8—Blood-supply to part of epiphyseal side of growth plate has been discontinued by interposition of polyethylene sheath. Reproductive cartilaginous cells have degenerated but have continued growing without becoming incorporated into bone.

Fig. 9—Epiphyseal changes caused by persistent pressure: *a*, increased thickness of epiphyseal cartilage *b*, zone of sclerosis of bone; *c*, cyst *d*, degenerated articular cartilage.

Fig. 10—"Cyst," filled by fibrous tissue without vascularisation, caused by pressure.

trabeculæ leading to (c) a typical bone-cyst under (d) degenerated disintegrating articular cartilage.

Injected specimens show that no vessel of any importance penetrates the centre of the cyst (fig. 10). If, instead of killing the rabbit while the pressure was still being exerted, the pressure was removed and the rabbit was allowed to survive for a few days, regeneration of the ischæmic area by new vessels was immediate. As supporting evidence we may add the sudden transformation of the hypertrophic growth cartilage in bone together with the invasion of the cyst by newly formed vessels (fig. 11), showing the great tendency to heal of all these damaged tissues once the compression has been removed.

Fig. 11—Four days after removal of sustained pressure revascularisation of "cyst" has already begun.

The area of maximum pressure in the direction indicated by the changes of the articular and epiphyseal cartilages shows numerous trabeculæ whose central lamellæ are dead or dying, surrounded by new laminæ which in well-injected preparations show intimate connection with vessels (fig. 12). Some of the areas of bone condensation, such as those surrounding a bone cyst, exhibit this necrotic or dying core buried under the strata of new lamellar bone. Thus experimentally the bone changes caused by ischæmia seem to stimulate the formation of bone through the mediation of vascular proliferation; this we had already suspected to be the case in human osteo-arthritis. Similarly, the consequence of interfering with the flow of fluid through an articular cartilage submitted to exercise and constant pressure will cause its final disintegration and, with it, the direct transmission to the underlying bone of all the evils of the crushing pressure.

Fig. 12—Dead or dying trabeculæ surrounded by new lamellæ of vascular origin. Inset, newly formed vessel adherent to old trabeculæ.

Ischæmia as Cause of Reshaping of Trabeculæ

We tried to discover the mechanism by which the trabeculæ in the spongiosa and the osteones in the cortical bone are oriented, and our conclusion is that the whole process is guided by the intimate relationship between tissue pressures and the flow of blood and other fluids. As long ago as 1905 Gerbhardt had the intuition that the architecture of bone is largely determined by the vascular system. Later, in 1923, Weidenreich noticed that the lamellæ of cancellous bone are always placed round spaces containing vessels and follow their direction; he also believed in the importance of pressure in determining growth or atrophy of bone.

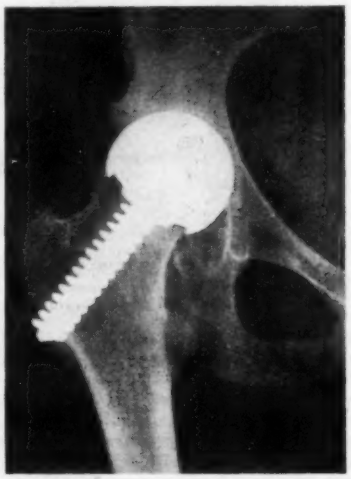


Fig. 13—Hip arthroplasty aiming at better distribution of stresses between metallic prosthesis and surrounding bone.

In our research on osteo-arthritis we repeatedly found suggestive evidence of the mechanism by which the trabeculæ most submitted to pressure—e.g., those that carry the load of gravitation—become hypertrophied. The increase in the load may be felt by the trabeculæ in three different ways: (1) by increase in the weight borne by them; (2) by reduction of the area or space through which the weight is borne; and (3) by increased duration of the load. The product of the weight and its duration, divided by the space $\frac{(W \times T)}{S}$ will indicate the amount of gravitational stress transmitted through the joint. Other factors, well studied by Pauwels (1952), ought to be considered—e.g., the distance of the great trochanter to the femoral head and to the mid-pelvic line, the shorter the distance the greater being the stress. To this I would add the crushing stress of locking the hip-joint in hyperextension: this submits the femoral head to pressures similar to that exerted by a pair of pliers in cracking a nut.

In the present experiments we studied not the earlier changes in the joint cartilage which we had found to be located in the non-weight-bearing area but the results of excessive tissue pressure which, in man, is caused by the combined action of the gravitational and muscular stresses. Degeneration of the articular cartilage causes the subchondral vascular proliferation which, penetrating the cartilage, abolishes its resilience by forming the osteophyte and causes pain. Pain limits movement of the joint; thus a more reduced area of the head of the femur and the acetabulum now support the weight for much longer. Muscular spasm joins with the other deleterious factors which end by destroying the joint.

Causes of Failure of Arthroplasty

My own belief is that the biological, rather than the mechanical, factors mentioned here are responsible for the failure of most current methods of arthroplasty. The great contribution by Smith-Petersen had its benefits curtailed by the poor treatment that the metallic cup gave to the vessels of the femoral neck as much as by the great reduction in the area of the head bearing the gravitational stress. The original method of the brothers Judet—a contribution which will be considered a landmark in progress towards a lasting solution—failed in numerous cases because the gravitational impact was too great for the vitality of the bone underlying and supporting the acrylic prosthesis. New approaches by the Judets, Merle d'Aubigné, Moore, Herbert, and others take into greater account the relatively frail nature of bone, and improvement in results must follow the use of methods that respect its vitality better. I am trying a prosthesis which is mainly based on the experience of our previous failures, but also on the good features of both the Smith-Petersen and the Judet methods. I prefer stainless steel and vitallium for their resistance and the absence of tissue reactions. I use a large head whose contact with the newly moulded acetabulum resembles somewhat that of the Smith-Petersen cup—contact which was in general satisfactory (fig. 13). Its shape is not far from that of the mushroom designed by the Judets: the only essential difference is that it is connected to the neck not by the loose contact of the thick stem but by a screw with relatively large flanges and a narrow core.

Preliminary results indicate that bone will remain alive between the flanges of the screw, as with previous types of screws. The weight-bearing area—that of intimate contact between metal and bone—is very substantially augmented by the introduction of the large flanges. The patient is kept off his feet for at least two months to allow sufficient time for the revascularisation of the central part of the neck in the spaces between the flanges. So far the first part of the programme seems to be satisfactorily fulfilled. The shortcomings, if any, of the method will probably appear before long.

Conclusion

If, as I believe, osteo-arthritis is mainly a disease of the joint tissues and is caused by the wrong distribution of joint stresses, even in cases where an endocrine imbalance probably helps to weaken the resistance of the articular cartilage, redistribution of pressures across the joint may bring lasting relief because the effects of excessive pressure are curable (Trueta 1954). It is this intrinsic curability of the osteo-arthritic process that makes me believe that, even in arthroplasty, lasting satisfactory results will be obtained when we learn to respect the laws of Nature, which work through the mediation of the blood-flow through the tissues. Thus the explanation of Julius Wolff's law of the relation between function and form may be found in the stimulus that suffering or death has on life (in this study identified with the blood-vessels) in accordance with the dictum found in *Leviticus*, **17**, 11: "For the life of the flesh is in the blood."

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THE SURVIVAL OF BACTERIAL SPECIES UNDER BACTERIOSTASIS

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In 1946 Dubos reported that, in the presence of gramicidin, pneumococci died rapidly, whereas *Streptococcus fæcalis* might survive for many days. Since then much work has been done on the interaction of antibiotics, including the effect of bacteriostatic drugs on the action of bactericidal drugs. Jawetz and his fellow workers (see review, Jawetz et al. 1954) have taken a leading part in this, and have emphasised the fact that bacteriostasis may gradually sterilise a culture. But little seems to have been said about the varying ability of different bacterial species to survive under such conditions.

Accordingly I decided to test the survival of some of the commoner pathogens, incubated in culture media containing bacteriostatic drugs in concentrations comparable to those attained in the body during treatment. If considerable differences were found in the survival of different species, this would, I thought, go some way to explain why bacteriostatic drugs will eradicate certain types of clinical infection but not others. The results reported were all obtained with chloramphenicol, but additional tests leave little doubt that, with sensitive bacteria, the effects of the other predominantly bacteriostatic antibiotics—including the tetracyclines and erythromycin—would be similar.

Bacteria undergoing bacteriostasis exist in very delicate balance between life and death, easily upset in any single test by minute changes in the environment; and an investigation of this kind, depending on in-vitro tests, is inevitably somewhat artificial. An attempt has been made to attain greater realism by using broth enriched with horse blood, and this has introduced an additional factor of variability into the experiments. Variability is likewise to be expected, however, when one is treating different patients.

Method

1. To prevent evaporation of the medium, screw-capped containers (usually of 5–6 ml. capacity) have been used to hold the 2 ml. of suspension under test.

2. Since bacteria undergoing bacteriostasis are presumably unduly susceptible to harmful agents, which may be present in an occasional bottle after cleaning, each test should be at least duplicated. Misgivings on this score have led to many repetitions of the work.

3. The medium must permit free multiplication of the bacteria; and for this purpose nutrient broth is often adequate—having the advantage that it allows a fairly accurate count of surviving organisms. Using this broth, however, the test becomes highly artificial in the case of an organism like the staphylococcus, which is mainly diplococcal in broth but forms clumps in serum and in pus. Much use has therefore been made of 20% horse-blood broth, first employed for delicate bacteria, such as *Hæmophilus influenzæ* and pneumococcus, but later for other species. It was surprising to find that many leucocytes were still alive in horse blood which had been kept refrigerated for a week or more and that a considerable degree of phagocytosis took place. But, although some of the bacteria may have been destroyed in this way, it appeared that the remainder, being aggregated in small clumps of dying leucocytes, were better able to survive. It seemed therefore that the conditions approximated to some extent to those in an abscess, and that for certain purposes horse-blood broth gave more realistic results than ordinary broth.

The numbers of bacteria surviving were estimated by spreading a standard drop (or, later, a loopful) of broth on a sector of a blood-agar plate. Aggregations of bacteria in the blood broth made accurate counting theoretically impossible, but it was found that in practice the method gave a useful

TABLE I—SURVIVAL OF BACTERIA IN BROTH CONTAINING 16 μG. CHLORAMPHENICOL PER ML.

Species	Days of incubation					
	0	1	2	3	5	7
Strep. faecalis	400	500	400	300	500	400
Strep. pyogenes ..	200	0	0	..	..	..
Staph. pyogenes ..	400	250	100	35	2	0
S. typhi	500	200	65	3	0	..
S. paratyphi B ..	1000	400	200	12	0	..
Esch. coli	1000	100	9	0	0	..

Note: The numbers show the number of colonies growing from a drop (c.0·02 ml.) spread on agar.

indication of the course of events. When the broth appeared to be sterile, its sterility was often confirmed by centrifuging and resuspending a larger sample in fresh medium. The lag period in the subcultures was often prolonged in the later stages of a test, so that two or more days' incubation was needed. Subcultures on blood-agar plates were found to be more reliable than those on nutrient agar, even with freely growing species.

4. The tests reported here were made with chloramphenicol which has the advantages of a wide spectrum, stability for more than two weeks in the incubator, and a reasonable level in the cerebrospinal fluid (a third to a half of that in the blood). Erythromycin seemed to be nearly as stable, but tetracycline was largely inactivated after five days. It has been assumed that blood-levels of 16–32 μg. chloramphenicol per ml. are readily obtained, corresponding to 5–10 μg. in the cerebrospinal fluid, and that higher levels can be expected with heavy dosage. Most of the tests have therefore been made with concentrations of 16–25 μg.; but the effect of 5 and 10 μg. has also been observed with strains of meningococcus, pneumococcus, and *H. influenzæ* in view of their association with acute meningitis. In addition a few individual strains have been tested over a wider range of concentrations.

5. The majority of the strains were isolated from specimens sent to the London Hospital Clinical Laboratory. With some species (e.g., of salmonella and brucella) only laboratory cultures were available. It is realised that as many strains as possible should be tested, but it is hoped that enough has been done to show that species vary considerably in their ability to survive.

6. The inoculum used at first was such that the sample drop, spread as soon as the test was set up, yielded 1–500 colonies—a number which could be counted or estimated with reasonable accuracy. In later tests the inoculum has often been much increased with organisms which tend to die out rapidly.

Results

Table I is shown as an example of an experiment in which five strains of different species were exposed to a concentration of 16 μg. chloramphenicol per ml. in broth. The first column shows the days on which subcultures were made, those on "Day 0" being taken as soon as the test was set up. The figures indicate, in round numbers, the number of colonies observed. It is possible that the variations with *Strep. faecalis* are largely due to faulty estimation; but, even as shown, the ability of some strains of this species to persist under conditions of bacteriostasis is remarkable considering that none of the others survived for as long as a week, *Strep. pyogenes* failing in this case even to survive for a day.

Table II indicates the general results obtained with the various species, listed according to their tendency to die out rapidly. The susceptibility of the neisseria was to be expected from the clinical reports. The strains of *H. influenzæ* and pneumococcus were derived (except a pneumococcus type I) from routine cultures. All these strains were respiratory in origin with the exception of two *H. influenzæ* from the meninges, one type b and the other type f from an unusual case in an adult. The latter strain to some extent "spoiled" the figures for the species, being somewhat more persistent and less sensitive than most of the others In general it seemed clear that in both species there were minor variations in susceptibility, and that a concentration of 10 μg. chloramphenicol per ml. was necessary to ensure either sterilisation, or a near approach to it, within two days. The brief survival of the two laboratory strains of *Corynebacterium diphtheriæ* is interesting in the light of Forbes's (1954) report that erythromycin, a bacteriostatic drug, was more effective than the bactericidal penicillin in clearing up carriers.

Mention must be made here of an untoward finding observed once with the type-f hæmophilus in 5 μg. chloramphenicol per ml. and once with a pneumococcus in 10 μg. Subcultures yielded a few colonies over a period of a week or more, the companion bottle in each case (and also two pneumococcal bottles with half the concentration of drug) becoming sterile much sooner. Examination of films suggested that the persistence was due to agglutination of the bacteria by antibody which chanced to be present in the blood.

Strep. pyogenes was not tested with the idea that penicillin might be supplanted by chloramphenicol in the treatment of acute streptococcal infection but in order to estimate the probable effect of a bacteriostatic drug on the carrier state, which often resists short courses of penicillin. The results suggest that this species would respond less rapidly than *C. diphtheriæ*, especially since in the carrier the presence of specific antibody would favour agglutination of the cocci.

The response of the staphylococcus, even in broth, is relatively slow; and, especially when the staphylococcus is clumped in blood broth, it is sometimes, though not always, indefinitely prolonged, positive subcultures sometimes persisting in the fourth week although frank multiplication is still controlled. These conditions may well reflect those in generalised staphylococcal infection, in which treatment, even with penicillin, against a sensitive strain must be prolonged in order to prevent recurrence derived from "persisters" in small abscesses.

Like the staphylococcus, the typhoid bacillus sometimes persisted in blood broth but sometimes died out in about a week. In the former case films once again suggested that agglutination of the bacilli into small clumps was responsible. In the human body, however, the bacillus probably multiplies to some extent within the host cells—a situation difficult to simulate in vitro. Similar results were observed in a few tests with *Salmonella paratyphi B* and *Escherichia coli*.

Although relapse is common in brucellosis after treatment with the bacteriostatic drugs, the use of blood

TABLE II—SURVIVAL OF BACTERIAL SPECIES IN PRESENCE OF CHLORAMPHENICOL

Species	Number of strains	Concentration of drug (μg. per ml.)	Medium	Original number of colonies per drop (average)	Result	
					Days of incubation	% surviving
Gonococcus	1	8 or 4	B.B. (boiled)	89×10^0	1	0
Meningococcus	1	10 or 5	B.B.	50×10^3	2	0
		2·5	,,	,,	3	0
H. influenzæ	10	16–20	,,	100×10^3	1	0–<0·1
	7	8–10	,,	,,	2	0– 0·1
	7	4–5	,,	,,	2	0– 1·0
Pneumococcus	10	16	,,	100×10^3	1	0– 0·1
	7	8–10	,,	,,	2	0– <0·1
	7	4–5	,,	,,	2	Up to ?10
C. diphtheriæ	2	16	,,	20×10^3	2	0
Strep. pyogenes	5	16	,,	20×10^3	5	0–<0·1
Staph. pyogenes	5	16–20	Broth	400	5–8	0*
	6	20–25	B.B.	,,	7–14	0–>100
S. typhi	4	16–20	Broth	500	4–7	0
	5	20–25	B.B.	,,	6–14	0–>100
Strep. faecalis	3	16–30	Broth	200	7–14	100±

Notes: Size of drop: 0·02 ml. (approx.).
Colony count: $100 \times 10^3 = 100$ colonies grew from spread of drop after 1 : 1000 dilution.
B.B. = 20% horse-blood broth.
*Staphylococci occasionally persist longer.

TABLE III—SURVIVAL OF SINGLE STRAINS IN VARYING CONCENTRATIONS OF CHLORAMPHENICOL

Species	Original no. of organisms per loopful	Overnight sensitivity (μg. per ml.) (see text)	Chloramphenicol (μg. per ml. in 20% blood broth)						
			64	32	16	8	4	2	1
H. influenzæ type f	23×10^3	2	..	..	2/0	3/0	4/0	5–9/<10	1/++
H. influenzæ (non-capsulated)*	33×10^3	1	..	..	1/0	1/0	1/0	5/0	2/++
Pneumococcus type 1	25×10^3	4–8	..	..	2/0	5/0	5/0	1/++	..
Strep. pyogenes	27×10^3	4	3/0	5/0	5/0	5/0	5/1000	1/++	..
H. pertussis (avirulent)	48×10^3	4–8	..	9/0	14/0	14/0	2/+++	1/++	..
Strep. viridans (endocarditis)	500×10^3	4–8	..	7/0	9/0	14/12	2/++	1/++	..
*Staph. pyogenes**	71×10	8	7/0	14/500	14/1000	2/++	1/++	1/++	..
Strep. fæcalis	35×10	8	9/0	14/71	7/+	2/++	1/++	1/++	..

Notes: 1. Standard loopful estimated at 0·007 ml.
2. Symbol of results: 2/10 = loopful yielded 10 colonies after 2 days incubation. + = moderate multiplication. ++ = free growth. 5/0 = first sterile subculture on fifth day.
* Preliminary culture in serum broth with cocci in clumps.

broth allowed little more persistence of any of the brucellæ than was observed in broth—a period of about a week. These organisms, even more than the typhoid bacillus, live and multiply intracellularly, and the methods described here are of little value in their study.

Strep. fæcalis has been singled out by Dubos and many others as an unusually persistent organism, and the present work has confirmed this. It was noticed, however, that not all strains of streptococci capable of growing on bile-salt medium—a simple preliminary test for the species—were of equal hardiness; even the three selected strains quoted in table II might vary in their performance. It is still remarkable that, when plain broth was the medium, subcultures over a period of two or three weeks sometimes continued to yield almost unvarying numbers of colonies.

Table III shows the results of titration of individual strains of various species in blood broth, so as to show the course of events and the relation between the overnight sensitivity and the ultimate result. The overnight sensitivity was roughly estimated, after one night's incubation, from the discoloration of the blood when free multiplication was observed. With a large inoculum, however, some effect on the blood may be seen when multiplication has been largely controlled, as with the pneumococcal bottle containing 4 μg. chloramphenicol per ml. The remarkable persistence in the 2 μg. bottle of *H. influenzæ* f was shown clearly in films to be associated with agglutination, when on the twelfth day the colony count was slowly increasing after a fall to one colony on the seventh day; but the clumps were small and it was obvious that sterilisation had almost been achieved. Agglutination was also observed with the four organisms which persisted longest—*H. pertussis*, *Strep. viridans*, the staphylococcus, and *Strep. fæcalis*.

An avirulent strain of *H. pertussis* was used because in this form the organism grows more freely; in blood broth multiplication was rapid. It was thought that the ability to survive bacteriostasis was likely to be associated with the species rather than with virulence. The table shows that sterilisation of the cultures was slow, and it may be added that the colony count on the third day from the bottle with 32 μg. chloramphenicol per ml. was estimated at about 1000. This result, considered in conjunction with those observed in treatment (Medical Research Council 1953), suggests that, as in scrub typhus, the ultimate extermination of the infection depends on the development of immunity, but that control of bacterial multiplication during the first week (when it is at its greatest) may modify the whole course of the disease, whose later symptoms may well be due to absorption of bacterial products during the earlier period.

Strains of *Strep viridans* isolated from endocarditis may vary considerably, not least in their rate of growth. The organism referred to in table III multiplied slowly on blood-agar and it will be seen that sterilisation was rather slow, like that of *H. pertussis*. A similar result was obtained with another slowly growing strain from a case which failed to respond to penicillin, even when combined with streptomycin, but was apparently cured when chlortetracycline (aureomycin) and penicillin were given together, the latter to prevent development of resistance. A third strain, a more rapid grower, died out in a few days in 10 μg. chloramphenicol per ml. It is therefore suggested that, although penicillin is the drug of choice in endocarditis, other antibiotics should not be ignored if the bactericidal ones fail.

Discussion

As I have explained, chloramphenicol was used in these experiments because it was the most suitable of the bacteriostatic drugs for the particular purpose. I must emphasise that the indiscriminate clinical use of this antibiotic is to be condemned because its toxic effects, though rare, are so serious that they can be discounted only in face of very serious infection, such as enteric fever or certain forms of acute meningitis for which the drug is well suited if the heavy dosage can be maintained.

The results obtained are not surprising, but they may perhaps help towards a more rational use of bacteriostatic agents. On certain bacterial species these drugs have in fact a lethal effect, though their action is probably always somewhat slower than that seen with the bactericidal group. To other species, however, they will not be deadly unless backed by the full inflammatory reaction of the body, which is lacking in conditions such as acute meningitis and endocarditis.

The apparent correlation between the clumping or agglutination of bacteria and their longer survival may have significance in endocarditis—a condition in which the presence of antibody may cause both agglutination and possibly a slower rate of growth, thus making the extermination of the infection more difficult. The occasional appearance of the same phenomenon in susceptible species, *H. influenzæ* and the pneumococcus, was rather startling; but if, as seems possible, the persistence of a few organisms is promoted rather than prevented by the action of antibody, this can rarely have significance in meningitis which is unlikely to occur in an immune individual. Nevertheless, the frequent recurrence of infection of these two species in chronic bronchitis after antibiotic treatment (*Lancet* 1955) would be of interest in this connection if it could be shown that a true recurrence was usual, rather than a fresh infection.

It remains open to question whether, in a scientific sense, survival under conditions of complete bacteriostasis is possible even with such a species as *Strep. fæcalis*. As is shown in table III—and this was confirmed by further experiment—the strain used (N.C.T.C. 6782) died out in 64 μg. chloramphenicol per ml., persisted with little change of numbers in 32 μg., and showed multiplication in 16 μg. When bacteria occur in clumps or chains, it is impossible to be sure that certain individuals are not slowly reproducing themselves while others are dying. The margin in concentration of the drug is a small

one but significant from the clinical aspect, as the work of Cates, Christie, and Garrod (1951) has shown: chlortetracycline and chloramphenicol were useless in the treatment of endocarditis due to infection with *Strep. fæcalis*.

It may also be argued that the action of a drug varies, being bacteriostatic for one bacterial species but bactericidal for another. Biochemical studies on the effect of chloramphenicol on the assimilation of amino-acids by bacteria, as reviewed by Gale (1953), were mainly concerned with the staphylococcus, in which the over-all action is on protein synthesis; but they give no suggestion of an alternative effect likely to bring about the rapid death of, for example, the pneumococcus. Further it should be noted that the species which seem to be most susceptible to the action of the drug are those which need frequent subculture, at least on simple media.

Jawetz and Gunnison (1953) question the description of drugs as bacteriostatic or bactericidal. Including penicillin in their argument, they state that, as the concentration of the drug rises, after a possible zone of stimulation, the growth of bacteria is inhibited before the lethal concentrations are reached. Admittedly at one stage the number of survivors must remain constant for a time, but this does not imply inhibition in the true sense of the word. The typical action of penicillin (see Florey et al. 1949) is maximal when the bacteria, in the absence of the drug, would be multiplying freely. Hence one may reasonably suppose that when the effect of penicillin is partial (because its concentration is low) its action on the individual bacterium is either bactericidal or ineffective—never being truly bacteriostatic. It is true that at much higher concentrations—unattainable, or not normally attained, in systemic treatment—the actions of some of the antibiotics may perhaps be reversed; but for practical purposes the use of the two descriptive adjectives seems to be justified.

Summary

Sensitive strains of various bacterial species have been tested for their ability to survive under conditions of bacteriostasis caused by adding chloramphenicol to the culture media. This drug was chosen for technical reasons, but the effect of other bacteriostatic drugs on sensitive bacteria is probably similar.

Tests were carried out both in simple media, such as nutrient or digest broth, and in 20% horse-blood broth. (The horse leucocytes appear to survive refrigeration for a week or more and incubation for a day or so.) Subcultures from the blood broth tended to remain positive longer than those from simpler media—perhaps because the bacteria were preserved by agglutination or clumping.

It seemed that, in relation to bacteriostasis, bacterial species might be regarded as:

1. *Highly susceptible.*—Gonococcus, meningococcus, *Hæmophilus influenzæ*, pneumococcus, *Corynebacterium diphtheriæ*.

2. *Moderately susceptible.*—*Streptococcus pyogenes*, *Staphylococcus pyogenes*, the coli-typhoid group, *Hæmophilus pertussis*, and some strains of *Strep viridans* isolated from cases of endocarditis.

3. *Insusceptible* (in practice).—*Strep. fæcalis*.

These findings are briefly discussed.

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THROMBOTIC MICROANGIOPATHY

HISTOLOGICAL DIAGNOSIS DURING LIFE

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THROMBOTIC microangiopathy (thrombotic thrombocytopenic purpura) is a well-established entity. Including Moschcowitz's (1924, 1925) original case and the 3 described here, at least 85 indisputable cases have been recorded (59 from the United States, 15 from Britain, and others from Cuba, Czechoslovakia, Finland, Germany, Hungary, Italy, and Switzerland). In addition, I know of over 30 unpublished cases, most of which I have seen through the kindness of colleagues in Britain and oversea. Only 35 of the 85 published cases had been reported by the end of 1951: of the 35 all but 3 British cases (Pagel 1949 [case 4—see Symmers 1952], Symmers and Barrowcliff 1951, Symmers and Gillett 1951) were from the United States, whereas 23 of the 50 more recent cases were reported from other countries. Of these 50 cases 17 were diagnosed during life, in contrast with only 4 of the 35 earlier cases. These figures reflect a greater awareness of the features of thrombotic microangiopathy, enabling it to be recognised oftener, both during life and post mortem.

Clinical Diagnosis

The clinical diagnosis is usually suggested by the development of a characteristic tetrad: acute febrile illness, hæmolytic anæmia, thrombocytopenic purpura, and neurological disturbances. In most cases this syndrome develops fully only late in the comparatively short course of the illness, and the diagnosis is seldom made until very shortly before death. If thrombotic microangiopathy is to be recognised early, the clinician must consider it in the differential diagnosis of every illness presenting with any of the components of the tetrad.

Biopsy

At present, only biopsy offers any hope of providing irrefutable confirmatory evidence of the diagnosis; it has so far played only an insignificant part.

Excluding the cases reported in this paper, biopsy was done in only 7 of the other 19 published cases which were diagnosed during life, and the result was positive in only 3. The lack of information from biopsies is due partly to the infrequency of the lesions in the vessels of the tissues which are usually chosen (skin and muscle), and partly to patients usually being too ill to undergo biopsy at the late stage when the diagnosis is ordinarily suspected.

Altschule (1942) was the first to suggest that thrombotic microangiopathy could be recognised in life, and the possibility that biopsy might aid diagnosis was first mentioned by Bernheim (1943).

The first 4 cases to be correctly diagnosed clinically were reported by Engel et al. 1947, Epstein et al. 1948, Singer et al. 1950, and Meacham et al. 1951. Biopsy was first done following clinical diagnosis in a case reported by Blackman et al. (1952); the first positive biopsy was recorded by Chediak et al. (1952).

Several workers since Bernheim (1943) have advocated biopsy in the hope that early diagnosis might help investigation of the nature and treatment of thrombotic microangiopathy.

Choice of Tissue

At necropsy, evidence of thrombotic microangiopathy has been sought in tissues accessible to biopsy, and these studies have shown considerable variation between cases: for instance, there may be many lesions in skin and skeletal muscle, but oftener the vessels in these tissues are not involved.

The blood-vessels in *lymph-nodes* and *tonsils* may be heavily involved, but this seems to be quite unusual.

Rackow et al. (1952) suggested *gum biopsy*; in 5 of my cases multiple sections from many samples of gum and tongue at necropsy showed lesions deep in the tongue in 1 case and in the gums in none.

The heavy involvement of vessels in the portal tracts prompted Rackow et al. (1952) to suggest *liver biopsy*. At about the same time, Chediak et al. (1952) reported typical lesions in a piece of liver obtained during splenectomy (lesions were also present in the spleen). It is likely that the risk of hæmorrhage in thrombotic microangiopathy will contra-indicate liver biopsy except at laparotomy.

Muscle biopsy has been uninformative in all 7 published cases in which it was recorded (Symmers and Barrowcliff 1951, Blackman et al. 1952, Chediak et al. 1952, Case Records of the Massachusetts General Hospital 1952, Adelson and Stefanini 1952, Adelson et al. 1954, Fisher and Creed 1955), and in 6 unpublished cases known to me; in 1 of my cases muscle biopsy showed abundant typical lesions, although skin biopsy showed none.

Skin biopsy, curiously enough, has rarely been done in thrombotic microangiopathy. A positive result was obtained in 1 clinically typical case of mine, in which, however, necropsy was not allowed (cited by Rackow et al. 1952); the result was negative in 4 unpublished cases known to me, and in the case of Adelson and Stefanini (1952). Chediak et al. (1952) did not give the result of their biopsy of a hæmorrhagic nodule in the forearm—presumably in the skin.

Biopsy of *bone-marrow* to demonstrate the vascular lesions was suggested by Fitzgerald et al. (1947). Marrow biopsy for hæmatological investigation was described in 4 cases (Altschule 1942, Engel et al. 1947, Epstein et al. 1948, Goldenberg et al. 1950) without mention of the blood-vessels: it is not clear from the reports whether the term biopsy was used in these cases to describe films of marrow obtained by aspiration, or conventional histological examination of excised specimens. Hæmatological examination of films of aspirated marrow has, of course, been recorded in many cases. Cooper et al. (1952) demonstrated thrombotic microangiopathy in paraffin sections of particles obtained by aspiration of bone-marrow in their 2 cases; the only other workers to adopt this procedure did not find vascular lesions in their case (Green and Green 1953). A high proportion of marrows examined post mortem in cases of thrombotic microangiopathy has shown the characteristic lesions; bone-marrow is probably second only to liver among tissues accessible to biopsy which are likely to contain diagnostic lesions. Marrow biopsy may, therefore, prove of value, contrary to what is suggested by the few published observations.

In contrast to the disappointing results of biopsy, there are 10 reports of finding the diagnostic lesions in *spleens* removed therapeutically.

Splenectomy has been done during the course of the illness in 12 cases; in 2 the splenic vessels were not mentioned (Engel et al. 1947, Ritama and Virkkunen 1953), but in all the others typical lesions of thrombotic microangiopathy were found (Baehr et al. 1936, Muirhead et al. 1948, Green and Rosenthal 1949, Gardner et al. 1951 [case 2—see Singer 1954], Meacham et al. 1951, Chediak et al. 1952, Tacket and Jones 1952, Barondess 1952, Adelson et al. 1954). In most of these cases the patient died shortly after operation.

Careful histological study of every spleen removed in cases of hæmatological disorders may reveal unsuspected cases of thrombotic microangiopathy; the central arterioles and trabecular vessels are those likeliest to show the diagnostic lesions.

The possible value of biopsy in the diagnosis of this disease requires further investigation. *Rib biopsy* may prove to be the procedure of choice, and could be combined with biopsy of skin and muscle through the same incision.

Rib biopsy demands particular care by the pathologist, when preparing the specimen, to reduce to the minimum the delay occasioned by decalcification; careful dissection is necessary because the thrombotic lesions are most numerous in the zone of the marrow cavity immediately beneath the cortex.

The increasing accuracy of diagnosis in thrombotic microangiopathy has not so far had any material effect on the treatment of this mortal disease, nor has it added much to our knowledge of its nature. This may be because diagnosis has usually been made at a late stage. Biopsy done early in the course of any illness which presents unexplained hæmolytic anæmia, thrombocytopenia, or neurological disturbances offers the only means as yet known by which thrombotic microangiopathy can be recognised early enough to allow full investigation into its nature and treatment. In 2 of the cases reported here diagnostic lesions were present for some time before the usual clinical manifestations developed. Since not all cases run a fulminating course, even when the components of the tetrad begin to appear, there is some slight hope that biopsy immediately after the diagnosis is first suspected may give valuable time for investigation and treatment.

Treatment

Until we understand the cause and nature of thrombotic microangiopathy, treatment can only be empirical. Blood and platelet transfusions, splenectomy, sulphonamides, antibiotics, cortisone, corticotrophin, vitamins, and heparin have so far had no important influence on the course of the illness, except apparently in 2 cases, reported by Gardner et al. (1951) (whose 2nd patient lived for nine months after splenectomy) and by Meacham et al. (1951) (1 of whose patients had a remission lasting for over two years after splenectomy).

Case-reports

In the following 3 cases of thrombotic microangiopathy, the characteristic histological lesions were unexpectedly found before any clinical manifestations appeared. The correct diagnosis was made at this stage in the first 2 cases; the lesions were not recognised until later in the 3rd case.

PRESENTING WITH LYMPHADENOPATHY

Case 1.—A man, aged 47, while living in England in 1953 began to show generalised enlargement of his superficial lymph-nodes, without other symptoms. His health had previously been good, apart from mild typhoid fever in 1942. He had been inoculated with typhoid-paratyphoid vaccines several times while serving in the Afrika-Korps. A year before the typhoid infection his spleen was ruptured when a depth-charge exploded nearby while he was swimming; his spleen was removed. He had never had any chemotherapy or treatment with antibiotics.

On examination three weeks after the nodes were first noticed the only abnormal findings were discrete, slightly tender nodes, up to 2·5 cm. in diameter, in the neck, axillæ, and groins. He had no fever.

Investigations.—Chest radiograph normal. Urine normal. Blood-count: red cells 5,100,000 per c.mm.; Hb 14·9 g. per 100 ml.; white cells 8600 per c.mm. (normal differential count); platelets in normal numbers in blood-films. Paul-Bunnell reaction negative. Agglutination reactions (salmonellæ, shigellæ, brucellæ) were consistent with former T.A.B. vaccination and typhoid fever, but otherwise negative. Wassermann and Kahn tests negative. Mantoux reaction positive (1 : 1000). Serum-albumin level 3·4 g. and serum-globulin level 3·3 g. per 100 ml. Erythrocyte-sedimentation rate (E.S.R.) 28 mm. in first hour (Westergren).

Axillary-lymph-node biopsy.—Sections showed simple reactive hyperplasia of the lymphoid follicles; many small arterioles and capillaries showed changes typical of thrombotic microangiopathy.

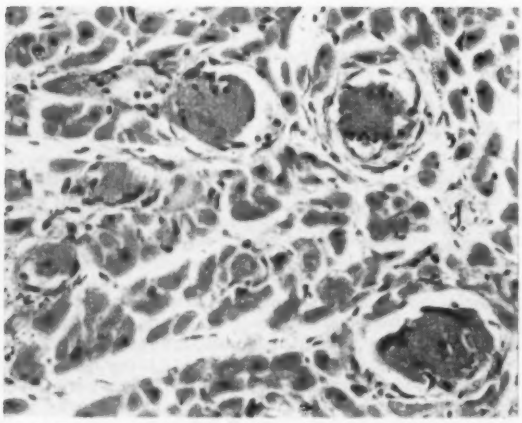

Fig. 1—Thrombotic microangiopathy in dilated myocardial capillaries in case 1. (Hæmatoxylin and eosin. × 250.)

Admission.—No treatment could be given at the time of biopsy because the patient was unwilling to remain under medical care; seven days later he was admitted to hospital because of sudden, painless hæmaturia. Temperature 99·4°F. He was very pale; clinical examination showed no other abnormalities, apart from the lymphadenopathy. Next day the patient was restless and confused, and had become slightly jaundiced; slight hæmaturia persisted, and blood oozed from his gums.

Investigations.—Empirical liver-function tests normal. Serum-bilirubin level 4·8 mg. per 100 ml., serum-albumin level 3·6 g. and serum-globulin level 3·2 g. per 100 ml. Prothrombin, bleeding, and clotting times normal. Blood-count: red cells 3,800,000 per c.mm.; Hb 11·0 g. per 100 ml.; white cells 13,000 per c.mm. (neutrophil polymorphs 9100, myelocytes 260, myeloblasts 65, eosinophils 260, lymphocytes 2665, monocytes 650); platelets scanty.

Treatment and course.—Blood-transfusions had no effect on the clinical or hæmatological picture. Treatment with cortisone (300 mg. daily) was started on the patient's third day in hospital. Four days later he passed into a muttering delirium; his condition rapidly weakened, and he died in coma. No hæmorrhages were found in the skin at any time, and the tourniquet test was negative.

Investigations on day of death.—Blood-count: red cells 1,800,000 per c.mm. (12% reticulocytes); 6 normoblasts per 200 white cells; Hb 5·6 g. per 100 ml.; white cells 28,000 per c.mm. (neutrophil polymorphs 22,960, myelocytes 840, myeloblasts 140, eosinophils 280, lymphocytes 3080, monocytes 700); platelets 62,000 per c.mm. No red-cell agglutination or hæmolysis in albuminous or saline media at 4°, 18°, or 37°C; Coombs test negative.

Necropsy.—Necropsy sixteen hours after death showed generalised, moderate enlargement of lymph-nodes throughout the body, a few serosal and mucosal petechiæ, a spleniculus (weighing 35 g.) at site of splenectomy, and red marrow throughout the upper half of a femur and humerus.

Histological examination showed typical lesions of thrombotic microangiopathy, abundant in the myocardium (fig. 1), adrenals, lymph-nodes, tonsils, pancreas, and bone-marrow, and scantier in the hepatic portal tracts, cerebral grey matter, and spleniculus; none was found in the skin, skeletal muscle, or kidneys. Sections of marrow showed erythroid and myeloid hyperplasia; the megakaryocytes looked normal. There was no evidence of leukæmia or extramedullary hæmopoiesis.

Lymphadenopathy as the presenting manifestation of thrombotic microangiopathy has not been described before. Enlarged lymph-nodes, apart from septic lymphadenitis, were noted in only 6 cases (Engel et al. 1947, Fitzgerald et al. 1947, Clinicopathologic Conference 1951, Barondess 1952, Laszlo et al. 1955, Prokš and Tomší 1955a and b); in none of these was the lymphadenopathy as striking as in this case. Purpura is rarely absent, as it was here; hæmaturia has been noted often, and may be the presenting symptom. Leukæmoid blood pictures have often been described and may be present only transitorily; in Ritama's (1954) case the picture was that of acute myeloid leukæmia. An unusual feature of the case described above was the absence of clinical abnormalities of the nervous system other than confusion and terminal delirium, which may have been nonspecific accompaniments of a severe illness.

PRESENTING WITH CONVULSION AND MENORRHAGIA

Case 2.—A woman, aged 21, was admitted to hospital half an hour after a fit while sleeping in the sun. Her sister, a qualified nurse, said that they had sunbathed for four hours; she described the fit as a major epileptiform convulsion, and it was noted in hospital that the patient's sun-suit was soaked with urine and that her tongue was bitten. There was no previous history of epilepsy or of any untoward reaction to exposure to the sun. She had previously had only trivial illnesses; since puberty she had been liable to boils, for which she occasionally took sulphonamides. Three weeks before the convulsion she had had a sore throat and pyrexia, treated with tablets containing sulphathiazole, sulphadiazine, and sulphamerazine; during this treatment a transient maculopapular rash developed.

On admission she was unconscious. Temperature 97·4°F. Pulse-rate 42 per min. Urine normal. She was menstruating scantily. Heart normal; blood-pressure 120/70 mm. Hg; electrocardiography showed sinus bradycardia. Pupils unequal in size, but reacted to light; tendon reflexes elicited with difficulty; abdominal reflexes absent; left plantar reflex extensor, right flexor.

Progress.—Two hours after admission the patient regained consciousness and complained of headache and thirst. Temperature 99·6°F; pulse-rate 110 per min. Two hours later she had a rigor (temp. 106·8°F); she was pale and weak, her pulse-rate was 148 per min., and she had bled copiously per vaginam. (Her menstrual history was normal, except that the present period was a fortnight late.) 5 pints (2·8 litres) of blood were transfused within two hours; the bleeding stopped soon after transfusion began. Next morning, eighteen hours after the convulsion, she felt well but tired. There had been no further vaginal loss, and there were now no neurological abnormalities. Blood-count: red cells 4,600,000 per c.mm.; Hb 12·0 g. per 100 ml.; white cells 7500 per c.mm. (normal differential count); platelets 310,000 per c.mm. That night uterine bleeding recurred; curettage was performed, and the bleeding stopped.

Histological examination of the curettings showed hæmorrhagic, menstruating endometrium; in addition, lesions typical of thrombotic microangiopathy were seen in the basal stratum of the endometrium and in the endocervix.

Repeated clinical examinations showed nothing abnormal apart from widespread sunburn (erythema without blistering) and slight evening fever. A patch-test with sulphathiazole was positive.

Laboratory investigations were consistently negative, apart from erythroid hyperplasia in marrow films and a reticulocyte-count of 5%. Red-cell, white-cell, and platelet-counts,

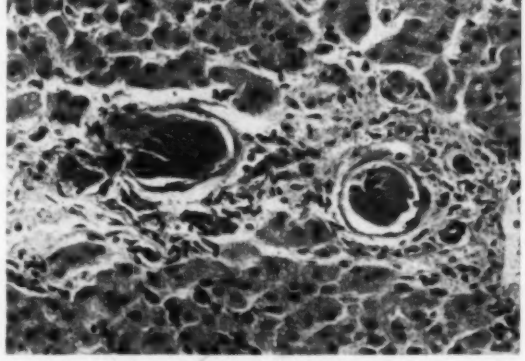

Fig. 2—Thrombotic microangiopathy in hepatic portal tract in case 2. (Hæmatoxylin and eosin. × 300.)

blood-cell morphology, osmotic and mechanical erythrocyte-fragility tests, hæmoglobin level, and E.S.R. were all repeatedly within normal limits. No hæmolysins or erythrocyte or platelet agglutinins were demonstrated. Wassermann and Kahn tests were negative. Cerebrospinal fluid (C.S.F.) normal. Serum chemistry, kidney and liver function tests and urine normal; radiographs of chest and air encephalographs normal; electro-encephalographs normal.

Two weeks after admission the patient went home, against medical advice.

Second admission.—Three days after discharge the patient was readmitted in a hypomanic state. (There was no history of previous mental disturbance.) After sedation she was found to have left hemiparesis, right facial twitching, and choreo-athetoid movements of the right arm. Next day the mental symptoms had disappeared, and the only neurological abnormalities were a left abducens palsy and some incoordination of fine limb movements. There was a slightly puffy erythema of the forehead, nose, and cheeks. Symmetrical, linear ecchymoses had formed in the skin below the breasts and across the scapulæ where her bust-bodice was tight, and a few petechiæ developed under the sphygmomanometer cuff when her blood-pressure (120/70 mm. Hg) was measured. No other clinical abnormalities were found, and her temperature was normal. Two days later she felt and looked ill, and her condition began to deteriorate. Fever developed, and continued until she died, with a daily temperature range of 100–102·4°F. On some days the tip of the spleen was felt. Neurological abnormalities disappeared, except for persistent exaggeration of the left patellar and ankle reflexes, and a left extensor plantar response.

Further investigations and course.—The red-cell count and hæmoglobin level fell from 3,800,000 per c.mm. and 10·4 g. per 100 ml. on readmission to 2,000,000 per c.mm. and 5·0 g. per 100 ml. two weeks later, after which the anæmia remained stationary. The white-cell counts remained about 9000 per c.mm., with about 6000 neutrophils. No immature red or white cells were seen in the peripheral blood; reticulocyte-counts were between 10 and 18%. Platelet-counts ranged between 20,000 and 250,000 per c.mm., with rapid variation throughout the illness; although the count was often below the "critical level" (40,000 per c.mm.) there was no purpura or further bruising, and no more petechiæ were found when the blood-pressure was taken. L.E. cells repeatedly sought, without success. Blood-cultures sterile. Agglutination reactions (salmonellæ, shigellæ, brucellæ, leptospiræ) negative. Jaundice appeared on the fourth day and increased with the anæmia. Urine: trace of protein; excess urobilinogen but no bilirubin; a few red cells. Cortisone (300 mg. daily) and aureomycin were given from the day of readmission, without effect. Repeated transfusions of fresh blood through silicone-treated apparatus did not influence the anæmia or the platelet-count, the variations in which were independent of the treatment. A fortnight after readmission the patient began to have hallucinations and went into a withdrawn, schizoid state. Choreiform movements and other transitory neurological abnormalities recurred, and her general condition deteriorated rapidly. Cortisone was administered in diminishing doses over four days, and was then discontinued. The patient began to have severe headaches; the retinæ and C.S.F. were normal. There was frank hæmaturia once. The blood-urea level rose to 108 mg. per 100 ml. and urinary output fell. The blood-pressure remained normal. Seven weeks after the initial fit she collapsed with sudden abdominal pain and rapidly deepening shock, and she died an hour later while being prepared for laparotomy.

Necropsy.—Many hæmorrhagic ulcers in the jejunum and ileum; one ulcer had perforated, flooding the abdominal cavity with intestinal contents and blood. Scattered serosal petechiæ. Pale, tough vegetations, up to 0·4 cm. in diameter, on mitral cusps; cultures of these were sterile. Spleen (weight 200 g.) and all other organs appeared healthy.

Histological examination showed thrombotic microangiopathy in most organs, particularly the myocardium, adrenals, liver (fig. 2), brain, bone-marrow, and myometrium; the lesions were scanty in ovaries, uterine tubes, stomach, colon, and kidneys, and were not found in skin, skeletal muscle, or lymph-nodes. The mitral vegetations had the histological appearances of verrucose endocardiopathy (Libman-Sacks disease).

This patient's history included 3 features of possible ætiological significance: (1) sensitisation to sulphonamides, (2) throat infection three weeks before the acute illness, and (3) onset of symptoms while sunbathing.

Sensitisation has been noted in other cases of thrombotic microangiopathy—to sulphonamides (Engel et al. 1947, Fitzgerald et al. 1947), penicillin (Gendel et al. 1952), oxophenarsine (Symmers 1956), formaldehyde (Clinicopathologic Conference 1951), and adhesive tape (Bernheim 1943). The significance of such sensitisation is not clear.

A recent *acute infection*, usually of the upper respiratory tract, has been noted in several cases.

Laszlo et al. (1955) described a case in which the illness developed after some weeks of *sunbathing*; the clinical manifestations suggested disseminated lupus erythematosus, and L.E. cells were found.

L.E. cells were sought unsuccessfully in 9 cases, including the present one (Gendel et al. 1952, Case Records of the Massachusetts General Hospital 1952, Barondess 1952, Cooper et al. 1952, Green and Green 1953, Vannucchi and Doni 1953, 1954, Clinicopathologic Conference 1955). Skin changes resembling lupus erythematosus were observed by Gendel et al. (1952), as in this case. Abnormalities of porphyrin metabolism were present in 1 case (Clinicopathologic Conference 1951) and were absent in the present one. Verrucose endocardiopathy was reported in 10 previous cases (Baehr et al. 1936, Engel et al. 1947, Meacham et al. 1951, Gendel et al. 1952, Barondess 1952, Vassar and Spain 1953); this is interesting because it supports the possibility of a relation between thrombotic microangiopathy and disseminated lupus erythematosus and other "collagen diseases" (Symmers 1953, Laszlo et al. 1955). Menorrhagia has been noted in 4 other cases (Fitzgerald et al. 1947, Blackman et al. 1952, Radnai et al. 1954) and metrorrhagia in 5 (Muirhead et al. 1948, Epstein et al. 1948, Green and Rosenthal 1949, Ellison and Lloyd 1954, Stuart and MacGregor-Robertson 1956). The absence of purpura in this case is particularly striking in view of the repeated finding of platelet-counts well below the "critical level." Intestinal perforation, the immediate cause of death in this case, has not been described before in thrombotic microangiopathy.

PRESENTING WITH ABDOMINAL PAIN

Case 3.—A previously healthy girl, aged 15, while at school, had a sudden, sharp pain in the right iliac fossa and vomited. The pain lasted for a few seconds only, and was followed by a persistent dull ache in the hypogastrium. Her doctor saw her a few hours later. Because her periods had occurred regularly every thirty days since their onset two years earlier, and she was at mid-cycle, he considered that the pain was caused by the bursting of an ovarian follicle; however, there was tenderness in the right iliac fossa, and he sent her to hospital.

On admission his diagnosis was confirmed by the finding of a hæmatoma in the right ovary, with a blood-clot protruding from it, and blood in the pelvis; examination of the rest of the abdominal cavity showed no abnormality except wide-

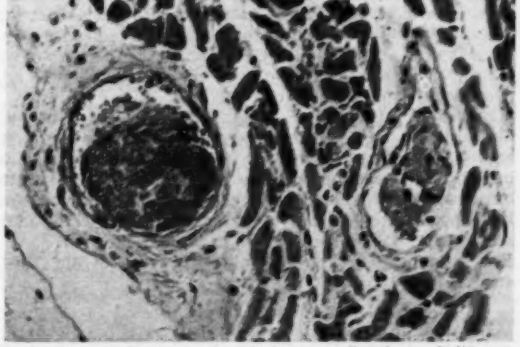

Fig. 3—Thrombotic microangiopathy in myocardium in case 3. (Hæmatoxylin and eosin. × 250.)

spread but scanty serosal petechiæ. Her appendix was removed.

Histological examination of the appendix showed thrombotic microangiopathy in the mucosal and subserosal vessels; there was no other abnormality. The significance of the vascular changes was missed at this time, and it was not until the pathologist saw sections from another case of thrombotic microangiopathy at a medical meeting some weeks later that he realised the nature of the lesions he had seen in the appendix. He learned then that the patient had subsequently died elsewhere.

Course.—The patient had returned to school four weeks after the appendicectomy, seemingly well but a little pale and tired, due, it was thought, to the operation and epistaxis since then. Two days after going back to school she complained of sudden headache, which rapidly became intolerable. She had photophobia, neck rigidity, and a positive Kernig's sign; there was a macular rash on her trunk, with punctate hæmorrhage in some macules, and her temperature was 104°F. She was admitted to hospital immediately as a probable case of meningococcal meningitis.

On admission she was unconscious, shocked, and pulseless. She was given 1 million units of penicillin and 50 mg. of cortisone four-hourly, as it was believed that she had developed the Waterhouse-Friderichsen syndrome; the shock-like state improved considerably, although she remained unconscious.

Investigations.—The C.S.F. was uniformly bloodstained; no organisms were found in films or cultures. Blood-culture sterile. Blood-count: red cells 2,600,000 per c.mm.; Hb 6·3 g. per 100 ml.; white cells 8000 per c.mm. (neutrophils 6400, eosinophils 400, lymphocytes 1200); platelets 36,000 per c.mm. When her coma lightened she was found to have right-sided hemiplegia, and cerebral hæmorrhage due to thrombocytopenia was then diagnosed. She died on the day after admission.

Necropsy.—There were many petechiæ and ecchymoses in the skin and serosæ. A very large hæmorrhage in the left cerebral hemisphere had burst into the lateral ventricle. The other organs looked healthy.

Histological examination showed thrombotic microangiopathy in the cerebral cortex, myocardium (fig. 3), adrenals, and liver; no other tissues were sectioned.

Abdominal pain has been reported in 15 cases of thrombotic microangiopathy (Altschule 1942, Engel et al. 1947, Fitzgerald et al. 1947, Muirhead et al. 1948, Clinicopathologic Conference 1951, Symmers and Gillett 1951, Barondess 1952, Rackow et al. 1952, Vassar and Spain 1953, Revill and Wilson 1954, Radnai et al. 1954, Ritama 1954). It was a presenting symptom in 10 of these cases. The patient whose case Gillett and I reported had polyarteritis nodosa, with an aneurysm in the pyloric region. Of the cases reported by Vassar and Spain (1953) 1 had a chronic gastric ulcer and another had acute gastric ulcers; Ritama's (1954) patient had also had a chronic gastric ulcer. In the rest of the cases there was no clear explanation of the pain.

Laparotomy was done only in the present case; the finding of peritoneal petechiæ is noteworthy, especially as their significance was not then appreciated.

Although the hæmolytic nature of the anæmia was not confirmed, this case was the only one of the 3 reported here in which the full tetrad of acute febrile illness, (hæmolytic) anæmia, thrombocytopenic purpura, and neurological disturbances developed. The neurological manifestations were not of the classical changing and evanescent type observed in case 2.

Massive intracerebral hæmorrhage has not been described in any published cases of thrombotic microangiopathy, but Adams et al. (1948) mentioned an unpublished case in which a large hæmorrhage in the brain was the cause of death. In most cases cerebral bleeding is petechial only; larger hæmorrhages (a centimetre or two in diameter) were described by Green and Rosenthal (1949), Pagel (1949), Meacham et al. (1951), and March (1954).

Summary

The possible value of biopsy in the diagnosis of thrombotic microangiopathy is discussed.

Biopsy, which so far has played little part in the study of this disease, should be considered as soon as the diagnosis is suspected, so that time may be gained for investigation of the disease and of possible lines of treatment.

Combined rib, muscle, and skin biopsy may prove to be the method of choice.

3 cases are described in which the diagnostic histological changes of thrombotic microangiopathy were found in surgical specimens (lymph-node, uterine curettings, and appendix) before the clinical syndrome developed.

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CLOSED TRAUMATIC LESIONS OF THE AXILLARY AND BRACHIAL ARTERIES

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IN three years we have seen 8 patients in whom closed injuries led to serious lesions of the axillary-brachial artery. Since few such cases have been published, we report them here.

Injury by Axillary Crutch

This group comprises 3 cases of thrombosis and 1 of aneurysm of the axillary artery. 6 cases of thrombosis from this cause have previously been published:

Platt (1930) described 2 examples, in men aged 38 and 46, both of whom had used axillary crutches from early childhood and eventually recovered full function of the limb without active treatment on changing to an elbow crutch.

The patient of Leriche and Stricker (1929) lost two fingers from gangrene before Leriche did an arteriectomy, removing 10 cm. of the artery; two years later the patient was free from pain and vasomotor symptoms.

In the cases described by Ryle (1922) and by Souques and Terris (1924) the outcome was not stated.

The present cases illustrate the symptoms and varying course of the condition.

Case 1.—A man, aged 56, who had used a left axillary crutch since an above-knee amputation of the left leg in 1907, was admitted on Dec. 11, 1954, complaining of numbness of the left hand and pain in the left forearm. Nine days previously he had wakened at 1 A.M. with tingling, numbness, and loss of power of the left hand, which had been normal the previous evening, though earlier in the day he had knocked it against the door of a railway coach. He noticed in the left forearm a dull aching pain which subsequently he found to be aggravated by use and relieved partially by rest with the limb dependent.

On examination his left hand was cold and pale, with no œdema and no distension of the superficial veins. He was barely able to flex or extend the fingers or wrist against gravity, though the power of elbow movements was little less than normal. Sensation to light touch and to pinprick was reduced over the whole limb below the elbow. The left axillary pulse was easily palpable as far as the posterior fold of the axilla, below which the artery could be felt as a pulseless thickened cord. The radial and ulnar arteries were impalpable. The pulse-rate was 80, blood-pressure 160/90 mm. Hg, and the heart clinically normal. All pulses in the right limbs and the left femoral pulse were normal and the vessel walls not thickened. The Wassermann reaction and Harris tests were negative. The diagnosis of axillary artery thrombosis was confirmed by arteriography, which showed $4^1/_2$ inches of artery to be occluded.

Operation.—On Dec. 20, 1954, left sympathetic ganglionectomy was done, the lower half of the stellate ganglion and the chain to below the 3rd thoracic ganglion being removed.

Postoperatively the left hand became warm and of normal colour. The patient was provided with an elbow crutch and warned against using the axillary one. Nevertheless, in view of the difficulty of using an elbow crutch with a weakened hand, he had continued to do so. On Jan. 28, 1955, pulsation was first detected in the brachial and radial arteries, though he complained still of numbness and weakness of the hand and hypo-æsthesia persisted below the wrist. In August he reported the return of normal sensation and no colour changes, but still some weakness of his hand.

Case 2.—A man, aged 54, had used a right axillary crutch for as long as he could remember after poliomyelitis in early childhood. He consulted his doctor for an attack of sudden pain in the right forearm and hand, associated with coldness, numbness, and loss of power of the limb.

On examination no arterial pulse was felt below the axilla, and the limb showed the appearance of threatened gangrene.

Operation.—Upper thoracic sympathetic ganglionectomy was done, and gradual recovery ensued. The patient is now symptom-free and following his normal occupation of book-binding.

These two patients illustrate sudden complete occlusion of the axillary artery after the use of an axillary crutch. In neither was there overt evidence of generalised arterial disease or any evidence of embolism.

Case 3.—A man, aged 57, with bilateral flaccid paralysis of the lower limbs since the age of 6 months, had used axillary crutches from early childhood. In January, 1953, he noticed in his right hand tingling and numbness, which became gradually worse. In February he developed pain in the right forearm and noticed that his fingers went white on raising his arm to the horizontal, and that the radial pulse was absent, with thickening along the course of the vessel. He was seen by a physician, who confirmed the diagnosis of thrombosis of the radial artery; above this the pulsation was normal. He was given tolazoline and nicotinic acid. By early May the thrombosis had extended upwards to the brachial artery, and he complained of pain at rest in his finger-tips. Anticoagulant therapy was started, and he was transferred to St. Mary's Hospital.

On admission he said that he could not sleep for pain unless his arm was hanging down. His right hand was pale and cold, and severe ischæmic muscle pains developed in his forearm on the slightest exercise of his fingers. His right axillary pulse was strong, but the brachial pulse ceased abruptly in the middle of the arm, below which the artery was palpable as a thickened cord. The pulses on the left side were normal, but the arterial walls were thickened though not tortuous. The reactive hyperæmic flush reached the level of the metacarpophalangeal joint 22 sec., and the finger-tips 46 sec., after release of the occluding cuff, compared with 3 and 5 sec. respectively on the normal side.

Operation.—Sympathetic ganglionectomy, removing the stellate ganglion and the chain to below the second thoracic ganglion, was done on May 19, 1953. This relieved the rest pain at once, and the hand became much warmer, but there was little improvement in the ischæmic muscle pain. On May 30, 1953, the thrombosis had extended up to the third part of the axillary artery, and when shaving he was compelled by ischæmic pain to stop every minute to lower his arm to his side.

Follow-up.—He was seen in September, 1955, when he was symptom-free at rest and could write, type, and play the piano without pain but developed ischæmic muscle pain if he shook a bottle vigorously (he is a dispenser). Pulsation has not returned at the elbow or the wrist.

The sequence of events in this patient is thought to be damage to the axillary artery by his crutch leading to partial occlusion of the vessel; subsequent breaking free of an embolus, which lodged in the radial artery and caused the initial symptoms; followed by ascending thrombosis, which eventually reached the site of the original abnormality in the axillary artery.

Case 4.—A woman, aged 58, with congenital hypoplasia of the right leg, had used since the age of 3 years a single unpadded axillary crutch made by her father and renewed as required. In January, 1954, she noticed in her right axilla a small swelling which her doctor considered to be of no significance. On March 8, 1955, she developed a sudden severe pain in her right arm from the shoulder downwards, and her hand and fingers became numb, cold, white, and powerless. She had no treatment other than rest, and a month later the pain had passed off, she could do her housework, and her hand was no longer white but was still so cold that she used to warm it on the teapot.

On examination in May, 1955, arteriography showed a fusiform aneurysm of the lower axillary artery and recanalisation of an occlusion of the brachial artery at the elbow. The ulnar artery was carrying most of the forearm circulation, and the radial artery filled poorly.

On admission on June 7, 1955, she said she was symptom-free. All the pulses were present in the right upper limb, though the radial was weaker than its fellow. The aneurysm was easily palpable, and she said that this was the lump she had noticed in 1954. Her hands were of normal colour, and

there was no sensory change and little difference of power between the two sides.

The aneurysm formed at the site of pressure of the axillary crutch on the arm and probably gave rise to an embolus, which lodged at the bifurcation of the brachial artery, producing the acute symptoms in March, 1954. It is uncertain whether the poor filling of the radial artery is a congenital abnormality or due to occlusion of the brachial bifurcation. In view of this, and the possibility of further embolism, sympathectomy was done to maintain the collateral circulation and to prevent occlusion by spasm in the event of further embolism.

Acute Thrombosis Due to a Blow

Case 5.—A man, aged 19, was, in May, 1954, standing on his bed cleaning his locker in an Army hut, when his friends pulled the bed from beneath him. As he fell, the open door of the locker was between his left arm and his body, and its upper edge struck him a sharp blow on the arm just below the axilla. Next morning his hand was cold, white, and powerless, and the hand and forearm were aching. No pulse was palpable below the axilla. Arteriography confirmed the diagnosis of thrombosis of the brachial artery.

Operations.—On June 18, 1954, at Queen Alexandra's Military Hospital, Millbank, the affected segment of artery was excised and an autogenous venous graft inserted. Thrombosis developed in the graft, and on Sept. 27, 1954, sympathetic ganglionectomy was done, removing the lower half of the stellate ganglion and the chain as far as the third thoracic ganglion. A week later secondary hæmorrhage necessitated ligation of the second part of the subclavian artery.

Follow-up.—When last seen in April, 1955, he had regained virtually normal use of his left arm, but found it a little weaker than his right. There were no colour changes in the digits, but there was a delay of a few seconds in reactive hyperæmia. There was still no palpable pulse in the arm.

This case illustrates well the severe symptoms which may follow sudden occlusion of the main artery of a limb, and the good recovery which may ensue in the upper limb even after the loss of an extensive segment of the vessel.

Case 6.—A man, aged 45, slipped at work in 1953 and struck the inner side of his right arm against the edge of a large wooden box. Next day his hand was white and cold, and he had in the forearm an aching pain which was worse on raising his arm. Severe ischæmic pain developed in the forearm muscles on attempting to use the limb. When he was first seen by us in October, 1955, there had been little improvement. The hand was still pale and cooler than its fellow, and he complained of pins-and-needles in his finger-tips on raising his arm. He found lathering his face difficult and could not satisfactorily strop his razor. Using a hammer quickly produced ischæmic pain in the forearm.

On examination the axillary pulse was normal, the brachial impalpable, and the radial much weaker on the affected than on the normal side. Capillary blanching tests showed appreciable delay in the peripheral circulation in the fingers. The diagnosis of thrombosis of the brachial artery was confirmed by arteriography, which showed local narrowing, amounting almost to occlusion, of a short segment of the artery in the middle third of the arm. The vessels above and below appeared normal, and the films revealed no cause for the narrowing.

Operation.—Upper thoracic sympathetic ganglionectomy was done on Oct. 24, 1955, and next day the hand was warm and of normal colour. The patient shaved without difficulty and stropped his razor for the first time since his accident; there has been no further paræsthesia.

Arterial Injury Associated with Skeletal Injury

Case 7.—A man, aged 22, was involved in a road accident at 11 P.M. on Oct. 4, 1953, and admitted to hospital, where he was found to have an unstable fracture of the upper third of the right humerus, with no radial pulse on this side. The hand was cold and blue, and there was no response to tolazoline or to papaverine. He was admitted to St. Mary's Hospital at 4 A.M. on Oct. 5, 1953, in good general condition, with blood-pressure 130/95 mm. Hg. There was considerable swelling of the upper arm and axilla, and the distal part of the limb was cold and blue as high as the upper third of the forearm. No pulsation was detected below the axilla, and the capillary blanching test on the fingers showed a return of blood in 14 sec. Despite these findings, power in the wrist and fingers was good, and there was no sensory disturbance. The probable diagnosis was considered to be traumatic arterial spasm, and reflex heating was begun. Four hours later the hand was warm and of normal colour, and the capillary blanching test was normal; but the arterial pulses were still absent.

Operation.—The fracture was therefore exposed and plated, and the main vessels were explored. The posterior humeral circumflex artery had been torn from the axillary, and at this point there was a severe contusion of the main artery, with thrombosis for 8 mm. Strong pulsation was present proximally. The affected segment was excised and a freeze-dried homograft inserted.

Progress.—Convalescence was normal; and in July, 1955, the patient reported his arm normal in all respects, and all pulses were present and equal on both sides.

This case was explored despite the evidence of excellent collateral circulation, primarily to treat the unstable fracture, and the opportunity was taken to explore and repair the damaged artery.

Case 8 was also of this type, rupture of the axillary artery being associated with anterior dislocation of the shoulder-joint in an elderly patient. This was treated by direct end-to-end anastomosis, with satisfactory restoration of the blood-flow. The arterial pulses were equal on the two sides when he was last seen three months after operation.

Discussion

The group of patients who used an axillary crutch is of interest. All the patients had used this type of crutch from childhood and for about fifty years before the onset of symptoms. They had, in fact, used their arms as legs for most of their lives and entered the age-group in which arteriosclerotic occlusions of the arteries to the lower limbs are becoming common. During the three years in which these patients were seen only 1 was seen with spontaneous occlusion of an upper limb artery, compared with 225 patients who developed similar lesions in the arteries of the lower limbs. It is therefore suggested that the stresses and strains normally borne by the lower limbs had been transmitted to the arms with comparable effects on the vessels.

In none of these patients was there any evidence of damage to the axillary vein or to nerves, although the whole of the neurovascular bundle must be stretched over the head of the crutch and its components exposed to much the same pressure. Nevertheless, all these lesions occurred at the site of pressure of the crutch on the limb, and clearly the trauma thus occasioned to the artery is a major factor in determining the onset of occlusion. The diagnosis of occlusion of the axillary artery presents few difficulties, but in the management of occlusion several factors must be taken into consideration:

(1) The prognosis is better than in similar lesions of the femoral artery, in that gangrene is less likely to supervene and, except in manual workers, any resultant ischæmic muscle pain is less of a disability in the arm than in the leg.

(2) The site and extent of the block, by their effects on the collateral circulation, have an important bearing on the final disability.

(3) The rate at which the artery becomes occluded largely determines the fate of the limb. Gradual occlusion allows time for the collateral vessels to enlarge and to provide adequate channels when occlusion of the main vessel becomes complete, with the result that symptoms may occur only on exercising the limb. A sudden occlusion, however, accompanied (as it may be) by spasm of a length of the artery and its collaterals, may leave the limb virtually bloodless and produce severe initial symptoms, with the danger of peripheral gangrene. Gask (1913) quotes 2 cases of axillary thrombosis in which gangrene supervened.

In cases of acute onset the aims of treatment are to prevent spread of the thrombosis and to dilate the

collateral vessels as quickly and as much as possible. They can be achieved by a course of anticoagulants, by the reflex dilatation of the vessels by heating the body and unaffected limbs, and by prescribing vasodilators of which we believe that alcohol is the best. Meanwhile the affected limb is kept cool and at rest (not raised) to reduce its oxygen requirements.

Should the patient not be seen until several days or weeks have elapsed, further thrombosis is unlikely, and we believe that sympathetic ganglionectomy is the best treatment at this stage; for, though gangrene is unlikely and useful recovery will usually take place in time, releasing the collateral vessels from vasomotor tone appears to hasten the process.

There remains the place of a direct attack on the occlusion. Gask (1913) attempted the operation of thrombo-endarterectomy of an occluded axillary artery of thirty-seven hours' duration. He succeeded in re-establishing the blood-flow, but the operation failed because clot re-formed almost immediately on the arterial suture line. More recent experience has shown that this operation is likely to be successful only in larger vessels.

If operation is required for some complicating condition (as in case 7), or if the patient is a young manual worker, an attempt can be made to restore the normal channel by excision of the affected segment, followed by either end-to-end anastomosis or the insertion of a blood-vessel graft.

Summary

8 cases of occlusion of the main upper-limb artery due to closed trauma are described.

The natural history of the condition is shown, and the aims and methods of treatment are outlined.

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ADMINISTRATION OF IRON IN ANTENATAL CLINICS

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PREGNANCY is a physiological state and should have no pathological effect on the hæmopoietic system of a normal healthy woman receiving an adequate diet. Nevertheless, to meet the requirements of the growing fœtus, adjustments in the hæmopoietic system are necessary, and of these the most important is an increase in the blood volume (Dieckmann and Wegner 1934, Roscoe and Donaldson 1946, Berlin et al. 1953). This increase is not uniform: whereas the plasma is increased by about 25%, the red cells and hæmoglobin are increased by only 12–13% (Roscoe and Donaldson 1946, McLennan and Thouin 1948). The disproportionate increase in plasma often causes the Hb level to fall progressively as pregnancy advances: between the 26th and 36th weeks of pregnancy the Hb level and red-cell count may be diminished by as much as 15% (Whitby and Britton 1953).

These changes, often called the hydræmia of pregnancy, have long been regarded as physiological, without any general agreement upon the definition of normal limits. Various workers have defined different minimal normal values. A red-cell count as low as 3,360,000 per c.mm., a Hb level of 10 g. per 100 ml. and a packed-cell volume of 33% have been suggested by Adair et al. (1936).

These blood changes are associated not only with an increase in blood volume but also with a deficient intake of iron (Young et al. 1946, Cartwright and Wintrobe 1949, Scott and Govan 1949, Ventura and Klopper 1951, Benstead and Theobald 1952, Davis and Jennison 1954, Fisher and Biggs 1955).

The iron requirements in pregnancy are known to be considerable. McCance and Widdowson (1946) found that the daily amount of iron needed by the pregnant woman was 16–20 mg., and Neuweiler (1938) estimated that the growing fœtus requires some 375 mg. of iron. These requirements may not always be fully met from the ordinary diet, which has been shown by Bransby and Magee (1947) to be close to iron starvation.

Present Investigation

The aims of the investigation were to determine the following facts in routine antenatal-clinic practice:

(1) How far the blood changes associated with the hydræmia of pregnancy can be prevented by the daily administration of a small dose of iron.

(2) The effect on the Hb level of a small daily dose of iron introduced at different stages of gestation. The stages chosen were the 16th, 20th, and 24th weeks. The lower limit of the 16th week was selected because few mothers ordinarily make their first attendance at the clinic before that date; and the upper limit of the 24th week because beyond that date the blood changes associated with hydræmia have in many cases already taken place.

(3) The value of the Hb level as an index of iron deficiency during pregnancy.

Choice of Iron Preparation

For administrative reasons iron in tablet form was preferred, and, despite its disadvantages, no suitable alternative to tabellæ ferri sulphatis compositæ (*N.F.*) was found. When the investigation was planned, ferrous gluconate was unobtainable, and enteric coated tablets, although likely to overcome the nausea associated with tab. fer. sulph. co., were rejected because iron is absorbed mainly from the stomach and the upper part of the small intestine (Endicott et al. 1949). Between 30% and 40% of pregnant women find it difficult or impossible to tolerate tab. ferr. sulph. co. (Benstead and Theobald 1952), but this intolerance may be partly psychological (Girdwood 1952). Accordingly we used, instead of the familiar green tablets usually issued at the antenatal clinics, white sugar-coated tab. ferr. sulph. co. containing gr. 3 of ferrous sulphate.

Hæmatological Investigations

The values determined were Hb level, red-cell count, colour-index, packed-cell volume (P.C.V.), mean corpuscular Hb concentration (M.C.H.C.), and mean corpuscular volume (M.C.V.).

Specimens of blood were taken from patients every four weeks into bijou bottles containing Wintrobe's oxalate mixture. Hb values were determined photo-electrically as oxyhæmoglobin in a single-cell 'Biochem' absorptiometer (100% Hb = 14·5 g. per 100 ml.); P.C.V. by Wintrobe's method; and red-cell counts with a standard improved Neubauer hæmocytometer.

Administrative considerations prevented the making of fresh films, but the use of oxalate films did not cause any difficulties. All the films were stained with Leishman's stain and examined by one and the same observer.

The colour-index was calculated in addition to the standard absolute values, to facilitate comparison with previous series.

In some specimens the hæmatocrit revealed a degree of hæmolysis sufficient to invalidate blood-count values. These specimens were excluded from the investigation, and immediate repeat samples were obtained when

TABLE I—MEAN HÆMOGLOBIN LEVELS RELATED TO PERIOD OF GESTATION

Period of gestation at first visit (wk.)	No. of patients	Mean Hb level (%)*	% of patients with Hb level below 10·15 g. per 100 ml. (70%)	% of patients with Hb level below 8·7 g. per 100 ml. (60%)
5–8	127	91·8	0·7	—
9–12	679	90·8	1·4	0·4
13–16	950	88·9	2·4	1·0
17–20	906	85·6	4·9	2·2
21–24	738	82·9	6·8	1·7
25–28	556	81·3	11·6	5·5
29–32	424	79·9	11·9	6·4
33–36	185	76·7	24·2	9·5
37 +	70	81·3	4·7	—

* 100% = 14·5 g. per 100 ml.

possible. Cases yielding more than one hæmolysed sample were omitted from the final analysis (see table II).

Hæmoglobin Levels During Pregnancy

In the City of Nottingham a sample of blood is taken from every expectant mother at her first visit to one of the ten antenatal centres of the local health authority. The mean Hb levels of 4635 blood samples examined in 1951–52 are shown in table I.

The mean Hb level is seen to be lower in patients whose pregnancy was more advanced, and the percentage of expectant mothers with a Hb level below the lower limit suggested by Adair et al. (1936) is seen to be higher, the later they attend for their first visit.

Benstead and Theobald (1952) showed that this "physiological anæmia" could be abolished by a dose of gr. 18 of ferrous sulphate daily from the 24th to the 32nd week of pregnancy. If this "physiological anæmia" can be abolished by a therapeutic dosage of iron from the 24th week, it should be possible to prevent its appearance by a smaller dosage of ferrous sulphate from an earlier stage, provided the mother is not already anæmic. This was the principle underlying the present investigation.

Material

In the first six months of 1953, 179 mothers whose Hb levels were not below 10·5 g. per 100 ml. volunteered to take part in the investigation. They were divided into four groups according to the stage of pregnancy at which iron was introduced, as follows: 16th week (30), 20th week (61), 24th week (45), and controls (43). Of these 179 women 65 (36·3%) yielded insufficient data to warrant their inclusion in the final analysis. The reasons for their exclusion are shown in table II. The remaining 114 mothers comprised 89 receiving iron and 25 controls.

Hæmatological Findings

A detailed comparison of the findings in the control and 16th-week therapy groups is shown in table III and illustrated in the accompanying figure. It was impossible to match these two groups exactly, but for the purposes of this study they are considered to be comparable in all relevant respects. Thus, both groups were drawn from clinics in various parts of the city and received the same antenatal supervision. The average age in the group receiving iron was 29·1 years and parity 2·5, compared with 28·1 years and parity 2·4 in the controls. At the beginning of the investigation the Hb levels of both groups were similar.

In the control group there were the following findings:

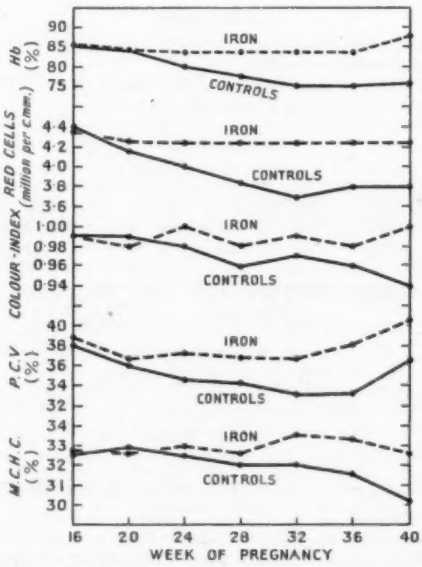
(1) A fall of 12% in the Hb level, maximal between the 32nd and the 36th weeks.
(2) A fall of 13% in the red-cell count, maximal at 32 weeks.
(3) A fall of 5% in the colour-index, maximal at 40 weeks.
(4) A fall of 13% in the P.C.V., maximal between the 32nd and the 36th weeks.
(5) A fall in the M.C.H.C., maximal at 40 weeks.
(6) An increase in the M.C.V., maximal at 40 weeks.

All these findings, except the reduced colour-index, are usually associated with the hydræmia of pregnancy.

In the 16th-week therapy group all the estimations and indices were maintained within the limits of experimental error as defined by Whitby and Britton (1953), except the P.C.V. which rose by 5·7%.

To assess the value of the Hb level two further groups of mothers who received the same daily dose of ferrous sulphate were studied from the 20th and 24th weeks of pregnancy. The findings are shown in table IV.

In these two groups all the indices and the Hb levels were maintained. The M.C.H.C. (the absolute index of iron deficiency) remained stationary, and the Hb levels, after a fall of 2–3%, reached at term a higher level than at the first examination.



Hæmatological findings in 16th-week iron-treated group and controls.

In the three groups which received iron, therefore, the Hb levels and all the indices were maintained, whereas in the controls they all fell.

Non-responders to Iron

Though it is true that the mean Hb levels were maintained throughout pregnancy in all three groups which received iron (tables III and V), there were some exceptions in each group. Thus, of the 89 mothers who received iron there were 20 (22·4%) whose Hb levels were not maintained. The hæmatological findings in these patients, comprising falls in Hb level, red-cell count, P.C.V., colour-index, and M.C.H.C., were similar to those in the controls. (The findings in these patients are included in the results given in tables III and IV.) In all the cases

TABLE II—CAUSES OF EXCLUSION FROM INVESTIGATION

Group	Uncooperative or defaulted	Admitted to hospital	Premature delivery or abortion	Removed from area	Intolerance to iron	Hæmolysis of samples of blood	Hb fallen too low
Control ..	4	4	1	1	—	2	6
16th week	4	2	2	—	—	1	—
20th week	13	3	4	1	6	1	—
24th week	2	—	2	1	2	3	—
Total ..	23	9	9	3	8	7	6

TABLE III—MEAN HÆMATOLOGICAL FINDINGS IN 16TH-WEEK THERAPY GROUP AND CONTROLS

Period of gestation (wk.)	Hb (%)*	Red cells (million per c.mm.)	Colour-index	P.C.V. (%)	M.C.H.C. (%)	M.C.V. (c.μ)
16th-week group (21 cases) :						
16	85·5	4·35	0·99	28·4	32·7	88·6
20	83·8	4·25	0·98	37·0	32·6	88·0
24	83·3	4·20	1·00	37·4	32·9	88·8
28	83·3	4·24	0·98	36·8	32·5	87·0
32	83·4	4·24	0·99	36·7	33·6	88·0
36	82·6	4·25	0·98	38·0	33·2	88·9
40	87·5	4·25	1·00	40·6	32·6	90·0
Controls (25 cases):						
16	86·5	4·39	0·99	37·8	32·6	86·1
20	84·0	4·15	0·99	36·2	32·9	86·0
24	80·1	4·02	0·98	34·4	32·6	86·0
28	77·4	3·85	0·96	34·2	31·8	86·3
32	74·6	3·70	0·97	33·0	32·0	88·0
36	74·6	3·80	0·96	33·0	31·5	90·0
40	76·6	3·80	0·94	36·3	30·2	91·5

*100% = 14·5 g. per 100 ml.

showing a significant fall in the M.C.H.C. or a fall in this index below 32% there was also a fall in the Hb level.

Discussion

The administration of iron during pregnancy presents certain difficulties. It has been estimated that 30–40% of expectant mothers will not take ferrous sulphate tablets routinely prescribed (Benstead and Theobald 1952). It has also been stated that iron administered during pregnancy does not maintain the Hb level (Hahn et al. 1951).

In this series the controls showed the changes associated with the hydræmia of pregnancy: the M.C.H.C. fell from a normal 32·6% at 16 weeks to 30·2% at full term—a level indicating iron deficiency not amounting to anæmia (Discombe 1954).

In the three groups treated with iron, however, the hæmatological values were maintained within normal limits throughout pregnancy in 69 out of 89 cases (77·6%) by the administration of a small daily dose (gr. 9) of ferrous sulphate.

Because of the relatively small number of expectant mothers included in the investigation the findings cannot be regarded as conclusive, but they do suggest that normal hæmopoiesis is only possible in the presence of an adequate intake of iron. These findings are therefore in keeping with those of Young et al. (1946), Cartwright and Wintrobe (1949), Scott and Govan (1949), Ventura and Klopper (1951), Benstead and Theobald (1952), Davis and Jennison (1954), and Fisher and Biggs (1955). The findings also indicate that the Hb level can be maintained by smaller doses of ferrous sulphate than those generally used. This is in keeping with the findings of O'Sullivan et al. (1955).

Only 8 women (5·4%) were excluded from the investigation because of intolerance to iron, and only 1 of the remainder who received iron complained of nausea of sufficient severity to interfere with her taking the tablets.

TABLE IV—MEAN HÆMATOLOGICAL FINDINGS IN 20TH-WEEK AND 24TH-WEEK GROUPS

Period of gestation (wk.)	20th-week group (33 cases)				24th-week group (35 cases)			
	Hb (%)	P.C.V. (%)	M.C.H.C. (%)	M.C.V. (c.μ)	Hb (%)	P.C.V. (%)	M.C.H.C. (%)	M.C.V. (c.μ)
20	83·6	36·8	32·8	88·3	—	—	—	—
24	80·2	36·1	32·6	89·5	83·4	37·7	32·5	88·2
28	80·0	36·0	32·3	89·0	82·8	36·4	32·7	88·3
32	80·6	35·0	33·0	89·4	81·6	36·6	32·6	88·0
36	81·2	36·0	32·3	89·3	84·4	37·2	32·4	87·3
40	84·0	38·1	32·8	91·5	85·5	37·2	32·6	89·1

Although the mean Hb levels were maintained in the three groups taking iron, the Hb levels of 20 of 89 mothers in these groups were not maintained.

Since none of these patients had an anæmia not associated with iron deficiency, or suffered any blood-loss, the fall in Hb level can only be attributed to the following causes :

(1) The mothers did not take the tablets (this was not established).

(2) The iron was not absorbed.

Non-absorption of administered iron has been reported by Scott and Govan (1949), Fisher and Biggs (1955), and O'Sullivan et al. (1955).

The Hb level is related both to the P.C.V. and the M.C.H.C., and a fall in the Hb level may be associated with a fall in either or both of these indices. A fall in the P.C.V. is associated with hydræmia, and a fall in the M.C.H.C. with a decrease in the iron content of the red cells. The Hb level during pregnancy therefore cannot by itself be taken as an accurate index of iron deficiency unless the P.C.V. remains stationary. This does not, however, lessen the usefulness of the Hb level in antenatal clinics.

Full hæmatological examination cannot be applied to even one sample of blood from every expectant mother attending an antenatal clinic, because this would place an impossible burden on laboratory services, and it is unnecessary.

In the absence of evidence of anæmia the following routine is suggested :

(1) The Hb level should be estimated at the first visit of every expectant mother to an antenatal clinic irrespective of her period of gestation.

(2) Every expectant mother should receive iron as a routine.

(3) The Hb level should be estimated again between the 32nd and the 36th weeks to determine whether it is being maintained.

If the Hb level is not maintained, a full hæmatological examination should be undertaken to determine the reason for the fall.

The Hb level used in this way can be a simple and reliable guide for routine purposes. Table I shows that the later an expectant mother attends for her first antenatal examination the more likely is she to have a low Hb level, and that in most cases this indicates a deficient intake of iron. Every expectant mother should therefore be encouraged to attend for antenatal care as early in pregnancy as possible.

Summary and Conclusions

A tendency to iron deficiency was revealed in expectant mothers by a progressive fall in Hb level, red-cell count, colour-index, P.C.V. and M.C.H.C. In a comparable group this tendency was prevented, and the hæmatological values maintained within normal limits, by the administration of a small daily dose of iron in the form of ferrous sulphate (gr. 9 corresponding to 315 mg. of elemental iron). Only 8 women (5·4%) were excluded from the investigation because of intolerance to iron, and failure to respond was observed in 20 of 89 cases (22·4%). Possible reasons for this failure are discussed.

The use of ferrous-sulphate tablets as a routine measure was effective in maintaining the Hb level and other hæmatological indices throughout pregnancy in 77·6% of 89 cases.

For the purposes of antenatal care routine estimation of the Hb level is a useful guide to the behaviour of the more accurate hæmatological indices and of determining the response to oral iron.

The Hb level should be estimated at the first visit and again at 32–36 weeks. Further hæmatological

investigation will be required only in a limited number of cases.

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TUBERCULIN IN AQUEOUS AND OILY SOLUTIONS

SKIN-TEST REACTIONS IN NORMAL SUBJECTS AND IN PATIENTS WITH SARCOIDOSIS

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THE reaction to tuberculin in sensitised subjects depends on (1) the local persistence of the tuberculin, (2) the availability of sufficient antibody-carrying cells, and (3) the capacity of the tissues to react to inflammatory stimuli resulting from the antigen-antibody reaction. The incorporation of tuberculin in an oily emulsion to form a "depot tuberculin" was found by Wassen (1936, 1939), Wassen and Swedin (1941), and Seeberg (1951a) to increase the local persistence of the tuberculin, leading to enhanced reactions of prolonged duration in sensitive subjects, and by Seeberg (1951b) to elicit positive reactions in patients with sarcoidosis, who had failed to react to aqueous tuberculin solutions. The conclusion that the oily emulsion had prolonged the local persistence of the tuberculin is supported by the report of Talmage and Dixon (1953) that radioactivated proteins persist longer locally if mixed in a similar emulsion.

We report here the results of comparing aqueous and "depot tuberculin" tests in:

1. Normal Mantoux-positive, normal Mantoux-negative, and B.C.G.-vaccinated subjects.
2. Patients suffering from sarcoidosis.

Materials and Methods

Purified protein derivative of tuberculin (P.P.D., Weybridge) was used for testing in aqueous solution and in an emulsion consisting of 8 parts of light liquid paraffin *B.P.*, 1 part of anhydrous lanolin *B.P.* as the emulsifying agent, and 1 part of the appropriate concentration of the aqueous tuberculin. In the B.C.G.-vaccinated subjects Old Tuberculin 1/100 was used throughout for the aqueous tuberculin testing. Intradermal tests were made on the outer skin of the upper arm, the volume of the injection being 0·1 ml. of the aqueous tuberculin and 0·05 ml. of the "depot tuberculin" and of the oily emulsion vehicle when this was used as a control. In preliminary studies it was found that P.P.D. in a concentration of 0·002 mg. per ml. of the oily emulsion gave a good reaction in sensitive persons, whereas higher concentrations evoked too vigorous reactions.

Readings were made at forty-eight hours and at intervals up to at least three months. Positive reactions to the "depot tuberculin" consisted of areas of erythema 20–40 mm. in diameter with a central induration of 5–10 mm. in diameter. These reactions persisted long after any reactions to aqueous tuberculin had disappeared. The possibility of non-specific irritation by the oily intradermal injection must be considered. Seeberg (1951b), for example, found that in tests made on the thick skin of the thigh the vehicle excited erythematous reactions which could be readily distinguished from positive reactions to the "depot tuberculin." In this investigation the thinner, more elastic, skin of the upper arm was used, and there were no significant or enduring reactions at the sites where the vehicle alone was injected, or at the sites of the negative "depot tuberculin" tests. These negative reactions to the oily material were marked by a barely palpable nodule in the skin.

Results

Mantoux-positive Normal Subjects

In 5 subjects giving positive reactions to 10 tuberculin units (T.U.) of aqueous tuberculin there were similar though more vigorous reactions to 5 T.U. of "depot tuberculin" at forty-eight hours. These reactions to both agents were 20–40 mm. in diameter with central induration 5–10 mm. in diameter. The reactions to aqueous tuberculin subsided within the first seven to ten days, whereas the indurated erythematous reaction to the "depot tuberculin" persisted for two to three months, the erythema becoming duskier with time and showing superficial exfoliation.

Mantoux-negative Subjects

18 normal subjects who failed to react to repeated intradermal injections of 100 T.U. of aqueous tuberculin also gave negative reactions to 5 T.U. of "depot tuberculin."

B.C.G.-vaccinated Normal Subjects

9 healthy subjects who were negative to repeated intradermal tests with 100 T.U. of aqueous tuberculin (Old Tuberculin 1/100) were given intradermal injections of the "depot tuberculin," and of the vehicle, one month before the projected B.C.G. vaccination. Six weeks after the B.C.G. vaccination, Mantoux tests were repeated with 100 T.U. of aqueous tuberculin on both arms for comparison with the earlier "depot tuberculin" tests. The results were:

Positive reactions to both aqueous and "depot" tests	4
Positive reactions to "depot" tests only	2
Positive reactions to aqueous tests only	0
Negative reactions to both aqueous and "depot" tests	3

In 6 of the 9 subjects, reactions appeared at the sites of the previously negative "depot tuberculin" tests about ten days after the B.C.G. vaccination. They started insidiously with an area of erythema about 15 mm. in diameter and became increasingly distinct during the ensuing week and remained unchanged for the next two months. At this time the reactions became duskier and disappeared by the end of three months.

5 persons failed to react to aqueous tuberculin after the B.C.G. vaccination. 4 of these had been vaccinated in the past and had either failed to convert or had converted transiently. Of the 2 who reacted only to "depot tuberculin" and not to the aqueous tuberculin one was being vaccinated with B.C.G. for the first time and the other was being revaccinated. These 2 patients were studied further by biopsy examination of the B.C.G.-vaccinated sites, which showed active tuberculous

tissue indicating that the B.C.G. had taken successfully. Of the remaining 3 persons who failed to react to either "depot" or aqueous tuberculin, 2 had failed to convert after previous B.C.G. vaccination, and 1 had converted transiently after vole-bacillus vaccination.

Patients with Sarcoidosis

The responses to 100 T.U. of aqueous tuberculin and 5 T.U. of "depot tuberculin" were compared in 23 proven cases of sarcoidosis of various degrees of activity. The results were:

Positive reactions to both the aqueous and "depot" tests ..	4
Negative reactions to both the aqueous and "depot" tests ..	6
Positive reactions to the "depot" test only	13
Positive reaction to the aqueous test only	0

	Negative	*Positive*
Aqueous tuberculin	19 ..	4
"Depot tuberculin"	6 ..	17

The "depot tuberculin" produced a brisk erythematous reaction about 35 mm. in diameter with central induration of 5–10 mm. within two days, except in 2 persons in whom an erythematous reaction appeared after seven days in one and nine days in the other.

Discussion

We know little of the fate of tuberculin in the tissues except that it starts to become fixed early, and that this is completed within one to two hours with a moderate skin-test dose (Pepys 1955a). The proportion of injected tuberculin retained locally by this "fixation" is unknown, but factors which influence its local persistence can modify reactions considerably. Increased lymphatic absorption of the tuberculin decreases reactions, whereas increased local retention increases reactions (Seeberg 1947, 1951a, Pepys 1953, 1955a). The long persistence of the tuberculin—e.g., with a "depot tuberculin"—favours a higher concentration for a longer period and leads to prolonged reactions in Mantoux-positive people. Such an enhancement could be expected to reveal lower degrees of sensitivity not elicited by aqueous tuberculin.

The interval of about ten days between the B.C.G. vaccination and the appearance of reactions at previously negative "depot tuberculin" tests corresponds to the time required for the development of hypersensitivity due to the infection. These reactions correspond to Wassen's (Wassen and Swedin 1941) findings in rabbits. He injected "depot tuberculin" into their skins and then infected them with tubercle bacilli. The "depot" tests reacted sixteen days after the infection, at which time aqueous Mantoux tests were also positive. These observations resemble the "revivescence" reaction in man, in whom previously negative tuberculin skin tests become positive on the appearance of active tuberculous infection, even months later, thus indicating the persistence of some of the tuberculin locally.

The "depot" tests were used as a deliberate "revivescence" test in the B.C.G.-vaccinated subjects. In the 2 patients who failed to react to aqueous tuberculin but gave positive reactions to the "depot tuberculin," the presence of tuberculous tissue at the B.C.G. vaccination sites was evidence of a successful take. In these patients the "depot" material may have revealed a degree of sensitivity too low to be elicited by the aqueous tuberculin. In the ordinary way these patients would have been regarded as candidates for repeated B.C.G. vaccination on the assumption that a failure to react to 100 T.U. of aqueous tuberculin meant that they had not converted. There are reports of Mantoux-negative B.C.G.-vaccinated people in whom enhanced reactions to revaccination with B.C.G. showed that they were hypersensitive to the product of these organisms (Saye 1948). The positive reactions to the "depot" tests in these 2 patients were evidence of conversion to tuberculin hypersensitivity.

The positive "depot" tests in patients with sarcoidosis may be due to a similar demonstration of a low degree of sensitivity which escapes aqueous tuberculin testing. Seeberg (1951a) obtained positive "depot" reactions in 6 of 8 Mantoux-negative patients with sarcoidosis. He claims that histological examination of the sites of these negative Mantoux tests in patients with sarcoidosis shows evidence of a tuberculin-type reaction, and he regards this as evidence of "latent" tuberculin sensitivity (Schaumann and Seeberg 1948). He suggests that the reaction to the "depot tuberculin" in patients with sarcoidosis is due to the prolonged retention of the tuberculin, which enables sufficient antibody-carrying cells to arrive and to react with the tuberculin. There is general agreement that the proportion of patients with sarcoidosis who fail to react to 100 T.U. of aqueous tuberculin is higher than in the general population. That these patients with sarcoidosis may nevertheless be basically tuberculin-sensitive is shown (1) by the reactions elicited with "depot tuberculin" by Seeberg (1951b) in 6 of 8 patients and by us in 13 of 19 patients who failed to react to aqueous tuberculin, and (2) by the report of Pyke and Scadding (1952) that Mantoux-negative patients with sarcoidosis could give positive tuberculin reactions when tested while under cortisone treatment.

Recent reports indicate that the sources of antibody responsible for the tuberculin type of hypersensitive response are cells of reticulo-endothelial origin, and that circulating lymphoid cells appear to be responsible for the initiation of the reaction (Pepys 1955b). The results of "depot tuberculin" tests in patients with sarcoidosis suggest that these cells are a poor source of reacting antibody in this disorder. This may explain the decreased sensitivity of such patients to a variety of delayed-type hypersensitive antigens (Sones and Israel 1954). The deficiency of delayed-type hypersensitive antibody is in contrast to the ready production of circulating antibodies in patients with sarcoidosis (Sands et al. 1955). Circulating antibodies are concerned in hypersensitive reactions of the immediate type, and there are many reports of undiminished reactivity to immediate-type tests in patients with sarcoidosis.

The remaining 6 patients with sarcoidosis who gave negative reactions to both aqueous and "depot" tests may be considered to be either insensitive to tuberculin or less sensitive than those patients who reacted to the "depot tuberculin." Some of the completely negative patients were among the more active cases, as judged by the more recent onset, florid skin changes, raised erythrocyte-sedimentation rate, and positive Kveim test. As regards the response to inflammation, there does not appear to be any obvious impairment in patients with sarcoidosis, since they reacted vigorously to the "depot tuberculin."

Summary

The reactions to intradermal injections of tuberculin in aqueous solution and in an oily emulsion ("depot tuberculin") were compared.

In 5 Mantoux-positive subjects, the oily tuberculin excited reactions which persisted for three months. No reactions were produced in Mantoux-negative subjects.

In 6 of 9 Mantoux-negative subjects vaccinated with B.C.G., positive reactions appeared within ten days of vaccination, at the sites of previously negative "depot tuberculin" tests made four weeks before the B.C.G. vaccination.

4 patients with sarcoidosis gave positive reactions to both the aqueous and "depot" tuberculin. Positive reactions were elicited by the "depot tuberculin" in 13 of the remaining 19 patients with sarcoidosis who did not react to aqueous tuberculin.

The long local persistence of the tuberculin in the oily emulsion probably made it possible to demonstrate degrees of sensitivity too low to be revealed by aqueous tuberculin tests.

References overleaf

BASAL HORIZONTAL LINES ON CHEST RADIOGRAPHS

SIGNIFICANCE IN HEART-DISEASE

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THE value of radiology in the study of patients with mitral valvular disease is well established, and emphasis has recently been placed on the diagnosis of pulmonary hypertension from the chest radiograph. Goodwin et al. (1952) have described narrowing and tortuosity of the peripheral pulmonary vessels from angiocardiographic studies of patients with mitral stenosis and pulmonary hypertension. Short horizontal lines at the periphery of the lower and mid zones of the lung fields were noted by Kerley (1951); and these too, have been regarded as a radiographic accompaniment of pulmonary hypertension in mitral stenosis (Goodwin et al. 1952, Whitaker and Lodge 1953). Such lines may sometimes be a permanent feature of the patient's radiograph, in which case their pathological basis appears to be collagenous thickening with hæmosiderin deposition, occurring in the interalveolar septa (Parker and Weiss 1936, Fleischner and Reiner 1954). Transient lines, however, seem to be commoner, and these probably represent either dilated lymphatics (Kerley 1951) or the accumulation of tissue-fluid in the interalveolar septa (Gough 1955). In either case, the presence or absence of transient lines should depend on the magnitude of the pressure at the venous end of the pulmonary capillary, and Grainger and Hearn (1955) have described evidence in support of this. A value approximating to this pressure can be obtained from calculations based on direct measurement of the left auricular pressure.

The present study was undertaken to discover whether any relationship existed between the occurrence of these lines and either the left auricular or the pulmonary arterial pressure. It was further hoped to reveal whether the magnitude of these pressures was a causal factor in the production of the lines.

Materials and Methods

RADIOGRAPHIC METHOD

Standard postero-anterior radiographs were examined for basal horizontal lines, from 100 patients with mitral disease and 16 patients with pulmonary hypertension arising from other causes. These films were then classified into three groups: "lines absent," "lines poor to moderate," and "lines marked." All the assessments were made by an independent radiologist who was unaware of the left auricular and pulmonary arterial pressures. Illustrative radiographs are not shown, owing to difficulty in reproducing fine lung detail.

PRESSURE MEASUREMENTS

Left Auricular Pressure

Tracings of the left auricular pressure have been made from patients with mitral disease considered for valvotomy since 1952 as described by Allison and Linden (1953). From each of the last 100 of these curves a mean pressure was calculated (Wiggers 1950). The pressure curve throughout a heart cycle was considered, and both its length and the area under the curve were measured. The mean pressure was then derived by dividing the area by the length. This is illustrated on a typical tracing in fig. 1, where the base of the rectangle equals the length of the heart-cycle and the height of the rectangle is the mean pressure. To balance the respiratory variation of left auricular pressure, a heart-cycle in mid-inspiration or mid-expiration was selected for measurement. This mean pressure probably approximates to the average pressure at the venous end of the pulmonary capillary.

Fig. 1—Tracing of left auricular pressure to illustrate method of deriving mean pressure.

Pulmonary Arterial Pressure

Tracings of the pulmonary arterial pressure were obtained during the same bronchoscopy from 64 of the above 100 patients (Allison and Linden 1955). From each curve the mean pulmonary arterial pressure was calculated by adding a third of the pulse-pressure to the diastolic level. This value approximated closely to that obtained by integrating the pressure curve as in the determination of the mean left auricular pressure.

The pulmonary arterial pressures of the 16 patients with pulmonary hypertension but without mitral disease were obtained during cardiac catheterisation, and mean pressures were again calculated from the tracings.

The time-interval between chest radiography and pressure recording was usually less than four weeks and never more than six months.

RELATION OF LINES TO PRESSURES

The assessment of each radiograph was related to the pressures from that particular patient. Thus, it was possible to relate lines to left auricular pressure in all of the 100 patients with mitral disease, and to pulmonary arterial pressure in 64 of them. The association of each of these pressures was then compared with lines. The 16 patients without mitral disease were included, in order to estimate the effect of pulmonary hypertension alone.

The difference in pressures in the three radiographic groups of patients with mitral disease were compared statistically by Student's "t" test (Fisher 1930), conventional orders of significance being adopted. Difference liable to occur less than 1 : 20 times by chance are described as barely significant, less than 1 : 100 times as moderately significant, and less than 1 : 1000 times as highly significant.

Results

Relation between Horizontal Lines and Mean Left Auricular Pressure in 100 Patients with Mitral Disease

Lines were present on the radiographs of 63 of these patients. No lines were found when the pressure was below 10 mm. Hg, but they were invariably present at mean pressures exceeding 24 mm. Hg. The classification

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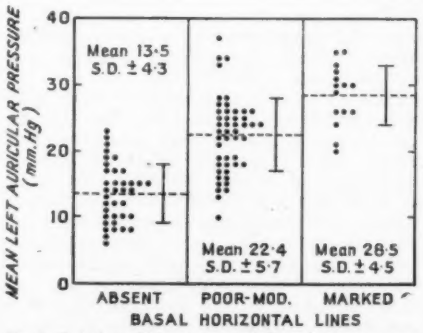

Fig. 2—Relation of lines to mean left auricular pressure.

of patients into the three radiographic groups is shown in fig. 2, which also indicates the range of pressures in each group. In the "lines absent" group, the individual pressures are scattered about a mean value of 13·5 mm. Hg, and in the "poor to moderate" and "marked" groups the means are 22·4 mm. Hg and 28·5 mm. Hg respectively. These means show clearly the higher pressures found in the groups with lines. Thus, the presence of lines on the chest radiograph of a patient with mitral disease seems to be direct evidence of a considerably raised left auricular pressure at the time the film was taken.

Relation between Horizontal Lines and Mean Pulmonary Arterial Pressure in 64 Patients with Mitral Disease

No lines were found below a mean pressure of 24 mm. Hg, but they were consistently present above 51 mm. Hg. The classification into groups and the distribution of the pressures are shown in fig. 3. In each group the range of pressures is much greater than in fig. 2, as indicated by the standard deviations shown for comparison in figs. 2 and 3.

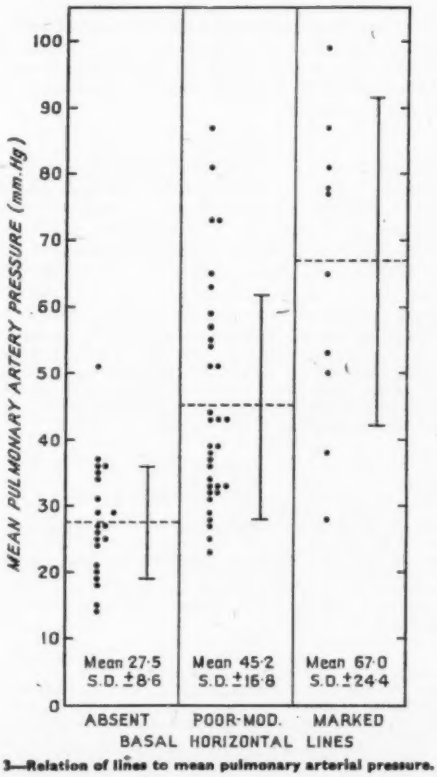

Fig. 3—Relation of lines to mean pulmonary arterial pressure.

Statistical comparison of the three radiographic groups in the association of left auricular pressures with lines (fig. 2), shows the difference between the means of any two groups to be highly significant. When pulmonary arterial pressures are considered (fig. 3), although the difference between the means of the "absent" and "poor to moderate" groups is highly significant, that between "poor to moderate" and "marked" is only moderately significant. The statistical data are summarised in table I.

Relation between Lines and Mean Pulmonary Arterial Pressure in 16 Patients with Pulmonary Hypertension from Causes other than Mitral Disease

Although the mean pressure for the whole group was 73 mm. Hg, only 2 showed doubtful lines, and no lines were seen in the remaining 14 patients. For 5 of the patients, measurements of left auricular pressure were available, 4 made during bronchoscopy, and 1 during cardiac catheterisation through an auricular septal defect. All these left auricular pressures were normal. Table II summarises the data from these 16 patients. These findings suggest that whereas patients with mitral disease and severe pulmonary hypertension almost invariably have lines, pulmonary hypertension alone is not the cause.

TABLE I—CLASSIFICATION OF RADIOGRAPHS IN PATIENTS WITH MITRAL DISEASE

—	Group 1 (lines absent)	Group 2 (lines poor to mod.)	Group 3 (lines marked)
Mean lt auricular pressure (mm. Hg.)	13·50 ±4·312*	22·44 ±5·709*	28·53 ±4·514*
Mean pulm. art. pressure (mm. Hg.)	27·50 ±8·609†	45·24 ±16·76†	67·00 ±24·45†

* Comparison 1 and 2 : $t = 4{\cdot}383$, $n = 52$, $p < 0{\cdot}001$.
" 2 and 3 : $t = 3{\cdot}693$, $n = 61$, $p < 0{\cdot}001$.
" 1 and 3 : $t = 10{\cdot}91$, $n = 50$, $p < 0{\cdot}001$.
† Comparison 1 and 2 : $t = 4{\cdot}383$, $n = 52$, $p < 0{\cdot}001$.
" 2 and 3 : $t = 3{\cdot}095$, $n = 41$, $p < 0{\cdot}01$.
" 1 and 3 : $t = 6{\cdot}404$, $n = 29$, $p < 0{\cdot}001$.

Discussion

From the results presented above, three important facts emerge :

1. Basal horizontal lines on the chest radiographs of patients with mitral valvular disease are accompanied by a raised left auricular pressure.
2. Lines invariably appear when the mean left auricular pressure exceeds 24 mm. Hg.
3. Elevation of the pulmonary arterial pressure alone appears to play little part in the production of lines.

The first two of these facts suggest that the factor responsible for radiographic evidence of lines is a rise in pulmonary capillary venous pressure to a level exceeding the colloid osmotic pressure of the plasma-proteins. This is indirect evidence for the now widely accepted view that the anatomical basis of the lines is an increase in the bulk of the interalveolar septa. Distension of these with tissue-fluid leads to the production of distinct and characteristic shadows on the chest radiograph.

From fig. 2 it seems that the scatter of the individual pressures about the means is larger than might have been expected. Some overlap of the pressures in the three groups is apparent, and the following reasons may account for this :

1. The time-interval between taking the chest radiograph and recording the pressures is important ; this is illustrated by the following case-record :

A woman, aged 41, with mitral stenosis was orthopnœic when first seen in May, 1955, and her chest radiograph then

TABLE II—FINDINGS IN 16 PATIENTS WITH PULMONARY HYPERTENSION ARISING FROM CAUSES OTHER THAN MITRAL DISEASE.

Case No.	Mean pulm. art. pressure (mm. Hg)	Mean lt auricular pressure (mm. Hg)	Lines	Diagnosis
1	88	..	−	Eisenmenger complex
2	104	..	−	" "
3	84	..	−	" "
4	60	..	−	" "
5	44	5*	−	Ventr. septal defect
6	61	..	±	" " "
7	36	5*	−	" " "
8	77	..	−	" " "
9	103	..	−	Aur. septal defect
10	56	2†	−	" " "
11	96	..	−	Pat. ductus art.
12	122	6*	−	" " "
13	68	..	−	Dextrocardia Single ventricle
14	29	..	−	Prim. pulm. Hypertension
15	68	..	±‡	" " "
16	78	2*	−	Emphysema Pulmonary hypertension

* Obtained by needle-puncture during bronchoscopy.
† Obtained by cardiac catheterisation.

showed well-marked basal horizontal lines. She remained at home on medical treatment, awaiting operation, and on admission four months later a further radiograph of similar quality showed almost complete disappearance of the lines. She was no longer orthopnœic, though still dyspnœic on exertion. The left auricular pressure, measured two days before operation, showed a mean value of 17 mm. Hg.

This patient had a mean left auricular pressure of 17 mm. Hg, associated with lines of " poor to moderate " quality. If no radiograph had been taken at the time the pressure was recorded, the only available film would have been four months old and would have shown " marked " lines.

Such a long time-interval was uncommon in this series ; in most instances the interval was less than four weeks. However, a period of medical treatment would always tend to lower the left auricular pressure, and patients in whom this occurred would have pressures lower than expected from the grade of lines shown on the radiograph taken before treatment was begun.

2. Only on films of good quality can lines of " poor to moderate " degree be seen with certainty. Under-penetration (accentuating the overlying soft-tissue shadows) or over-penetration (eliminating the fine detail) will each cause lines to be missed. These radiographic factors may have applied to a few patients in this series. These, in spite of being in the higher pressure range, would then appear in the " lines absent " group.

3. The build of the individual patient sometimes caused difficulty, particularly in those female patients whose heavy breast shadows obscured the detail of the lower zones of the chest radiographs. Here again, patients with left auricular pressures falling in the higher range would appear in the " lines absent " group.

If the appearance of basal horizontal lines on the chest radiographs of patients with mitral disease depends on a critically raised left auricular pressure, such lines might be expected in other forms of heart-disease in which pulmonary œdema occurs. That they may appear in such patients is shown by the following case :

A man, aged 38, was admitted to hospital in May, 1955, with a history of progressive dyspnœa on exertion for four months. Chest radiographs showed basal lines of " poor to moderate " quality, and at this time the patient was orthopnœic. Myocardial infarction was diagnosed. He improved slowly, and by June, 1955, he was no longer orthopnœic ; chest radiography now showed the lines to have disappeared. He was discharged home, but was readmitted seventeen days later with pulmonary œdema from which he died. Necropsy showed extensive myocardial and subendocardial fibrosis with one small area of recent infarction.

This is one of several cases in which lines were first shown during a period of left ventricular failure : such lines appear to be transient, and rarely fall in the " marked " category. " Marked " lines would seem to require a high and relatively constant left auricular pressure—a state of affairs which must be unusual in disorders other than mitral disease.

Finally, the relation of the lines to frank pulmonary œdema should be mentioned. For pulmonary œdema to arise, the pulmonary capillary pressure must exceed the colloid osmotic pressure of the plasma proteins (Hayward 1955) and tissue-fluid must pass through the alveolar walls into the alveoli themselves. Parker and Weiss (1936) have shown that œdema of the interlobular septa can arise independently of alveolar transudation, and that the thickness and texture of the alveolar wall plays an important part in determining whether or not alveolar transudation occurs. It is reasonable to suppose that the recent appearance of lines in heart-disease indicates a level of left auricular pressure not far below that necessary for production of pulmonary œdema. Such recently occurring lines, therefore, are radiographic evidence of a dangerously high left auricular pressure, and their appearance in a patient with mitral disease warrants early consideration of more intensive treatment, including valvotomy.

Summary

The chest radiographs of 100 patients with mitral disease have been examined for basal horizontal lines. These were found in 63 patients, and the lines were correlated with both mean left auricular pressure and mean pulmonary arterial pressure. A much closer relationship was found with the left auricular pressure than with the pulmonary artery pressure ; the left auricular pressure has a dominant rôle in the production of lines.

The chest radiographs of 16 patients with pulmonary hypertension arising from causes other than mitral disease were also examined. 14 of these showed no lines, and the findings in this group support the view that pulmonary hypertension alone is not the cause of the lines.

The recent appearance of basal horizontal lines on the chest radiographs of a patient with mitral disease indicates a dangerously high left auricular pressure, and warrants early consideration of more intensive treatment, including valvotomy.

ADDENDUM

Since this paper was written Bruwer et al. (1955) have presented evidence, based on determinations of pulmonary arterial and pulmonary capillary pressures recorded during cardiac catheterisation, that the pulmonary capillary pressure is the more important factor in production of lines. Our conclusions accord with theirs.

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FŒTAL MORTALITY IN PREGNANT DIABETICS

STRICT CONTROL OF DIABETES WITH CONSERVATIVE OBSTETRIC MANAGEMENT

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PREGNANCY in diabetics has not been studied long, and not until the 1940s was it generally known that the fœtal mortality was still very high (about 40%) and not much different from the mortality in the pre-insulin era, in contrast to the prognosis of the mothers, which became good after the advent of insulin.

It seemed to us that, before introducing any additional therapy, we should determine the basic fœtal mortality after intensive classical treatment. Accordingly in January, 1946, we started, in this department, a clinical trial of strict control of the diabetes and conservative obstetrical management by a few doctors.

This trial has now lasted nearly ten years; so we outline our treatment and report the fœtal mortality observed during that time. The material comprises 265 cases from January, 1946, to Sept. 30, 1955. In addition, we use for comparison our old Rigshospital material of 1926–45, comprising 157 cases—a grand total of 422 cases.

Control and Treatment

The mother is examined as an outpatient every three weeks during the first four months of pregnancy and then weekly. About eight weeks before the expected term she is admitted to hospital and remains there until delivery, which is induced about three weeks before term.

The main feature of our new programme is the control and treatment of the diabetic in hospital during the last months of pregnancy. Our aim is to obtain the best possible chemical control of diabetes by giving a measured diet and plenty of insulin. The diet contains about 1900 calories, 80–90 g. of protein, 175–200 g. of carbohydrate, and about 80 g. of fat; and in addition a supplement of vitamins, calcium, and iron is given. The blood-sugar level is controlled by altering the insulin dosage and by distributing the diet over five or six meals, according to individual requirements. We nearly always use protamine-insulin retard (N.P.H. insulin) combined with ordinary insulin twice a day, the average daily dose being 70 I.U. Capillary blood-sugar determinations, of which three are postprandial, are made four times daily by the Hagedorn-Jensen method (total reduction) and we try to keep the blood-sugar at the physiological level. The extent to which this aim is attained is exemplified by the fact that in the first 18 long-term treated cases (see below) the level of the blood-sugar (average of the four daily determinations during the last continuous stay in hospital, which averaged 52 days for the 18 patients) ranged from 108 to 167 mg. per 100 ml., the over-all average being 133 mg. per 100 ml. In the later years we have calculated the average level for one day now and then and found averages of 133, 135, and 130 mg. per 100 ml.

To combat toxæmia, hydramnios, and œdema, table salt is restricted. Phenobarbitone has been administered in some cases, and abdominal amniotomy tried in a few; but no hormones, mercurial preparations, ammonium chloride, rutin, or similar substances are used.

Pregnancy is usually terminated at the beginning of the 38th week, on average 20 days before the calculated term. Nearly all deliveries are induced with drugs and/or by rupture of the membranes. Up to now only 29 cæsarean sections (11%) have been done on obstetrical indications, whereas low-forceps deliveries are common. In about 20% of the cases labour started spontaneously.

As a routine the newborn babies are placed in incubators and given oxygen, warmth, and humidity for the first twenty-four hours. During this period the babies are fasted (Pedersen 1952, Pedersen et al. 1954). A pædiatrician is called when needed.

The treatment of long-term treated patients (see below) during the ambulatory period and the daily treatment of all inpatients are given by one physician (J. P.). The delivery, too, is managed by only a few doctors under the supervision of one of us (E. B.).

Long-term and Short-term Treatment

Knowledge of the control and treatment of diabetes in Denmark is essential for an understanding of what follows. The control is decentralised and, apart from two private hospitals for diabetics (Steno Memorial Hospital and Hvidøre Hospital), we have no diabetic clinics or units; the treatment is given by general practitioners, and to some extent by medical outpatient departments, specialised physicians, and the two above-mentioned clinics. The antenatal care, too, is decentralised, and we have only a few obstetrical outpatient departments in Denmark.

Our department receives emergency cases and all kinds of obstetrical complications without selection and, from 1946, all pregnant diabetics wanting or needing admission to the Rigshospital. We have pleaded with diabetics to get in touch with this department not later than about the 30th week of pregnancy.

Thus the diabetics attend our department at very different stages of pregnancy, a few from the earliest months and others not until they are in labour. But most of them are seen toward the end of pregnancy. Thus we have not been able to follow our recommended schedule for all the patients, and they have not had the same amount of control and treatment. We have to divide the material according to the amount of treatment received, but this must be done by dividing according to the stage of pregnancy at which the patient first applies to the clinic, because this determines how long the patient might be treated. Those who are seen at least 53 days before the calculated term are classified as long-term treated, and those who are not seen until later as short-term treated. (These phrases should not be confused—as has been done—with long-term and short-term diabetes.) The patient is always designated short-term if she is in pre-coma or in labour or has already been delivered when first seen. Likewise short-term applies if delivery takes place, or the baby dies, within 8 days after the patient's first application for admission.

This classification is objective and unbiased and is made 9 days after the patient's first application. The reason for choosing 53 days before term is historical and is explained by Pedersen (1954a). The criterion for long-term treatment makes the results in this group seem worse than they are because the deaths of babies whose mothers applied to the hospital in due time are allotted to the long-term group after only 8 days' treatment, whether the mothers have been outpatients or inpatients during this short period.

The most important difference between the long-term and short-term groups is the length of treatment in department B (table I): 78% of long-term but only 10% of short-term patients stayed continuously in hospital for 30 days or longer immediately before delivery. In other words, the long-term group was admitted to hospital on an average on the 65th day before the

TABLE I—MAIN DIFFERENCE BETWEEN LONG-TERM AND SHORT-TERM TREATED CASES

Treatment	Patients who have been in hospital last 30 days or more before delivery (%)	Average length of treatment in hospital just before delivery (days)
Long-term	78	45
Short-term	10	15

calculated term and treated in the hospital on average for the last 45 days before delivery, whereas the short-term group was admitted to hospital on the 35th day and treated for only the last 15 days. The treatment, however, both medical and obstetrical, is the same in the two groups.

Severity and Complications of Diabetes

Table II shows the severity and complications of diabetes and the number of primiparæ in the material of 1946–53. The diabetics are classified according to the system of White (1949). We have been forced to omit her group E because we have no information about the state of our patients' pelvic arteries. About two thirds of the cases were severe (White's classes C–F); and our material, like White's, differs in this respect from most other material, which does not contain so high a proportion of severe cases.

Short-term Group as Control

Table II shows that there is no major difference between the long-term and the short-term groups as regards severity and complications of diabetes; and, as already mentioned, all the patients are treated in the same way obstetrically and medically. Only one factor varies—the duration of treatment. So our material is well suited for research into the significance of the strict medical treatment in a hospital for a long time compared with a short time during the later part of pregnancy (table I).

Fœtal Mortality

The fœtal mortality (stillbirths and neonatal deaths within 10 days after delivery) of babies weighing 1000 g. (2 lb. 3 oz.) or more is shown in tables III–V. We have only a very few early abortions, spontaneous as well as induced, because such cases are admitted to other hospitals. On the other hand, our puerperæ with their infants are routinely transferred to their homes (or other hospitals) on the 10th day after delivery.

TABLE II—SEVERITY AND COMPLICATIONS OF DIABETES AND FREQUENCY OF PRIMIPARÆ IN LONG-TERM AND SHORT-TERM TREATED DIABETICS (1946–53)

	No. of cases (%)	Long-term treated (%)	Short-term treated (%)
White's classes:			
C, D, and F	64	65	62
D and F	32	33	32
Diabetic retinitis	23	26	21
Diabetic nephropathy (pyelonephritis) ..	24	28	22
Calcified arteries	5	8	4
Primiparæ	44	37	49

In 1926–45, before the introduction of the strict treatment, the over-all fœtal mortality was 38% (table III). Since then this mortality has decreased to 27% (1946–52) and 15% (1953–55). The first decline from 38% to 27% was due to the introduction of the long-term group, in which the mortality was only 12%, whereas the fœtal mortality in the short-term group (36%) remained unaltered. The further drop in the total fœtal loss to 15% was mainly due to the fact that an increasing proportion of cases were long-term and to small decreases in the fœtal mortalities—in the long-term group to 8% and in the short-term group to 27%. The fœtal mortality in the long-term group was about a third of that in the short-term group in both 1946–52 and 1953–55. Table IV shows that the difference of the mortalities, with a ratio about 1 : 3, holds good in several subdivisions of the material.

The mortality in the short-term group was due partly to pre-coma or to other forms of gross neglect relatively early in pregnancy, further to death in utero or to early delivery for conditions—e.g., malformations—which could not have been cured even by the most strict supervision and treatment. Table V shows that such conditions are not the main cause of the difference in mortalities. In the babies weighing at birth 1600 g. ($3^1/_2$ lb.) or more and alive at the onset of labour there was still a difference of 1 : 3 in the mortalities (6% in the long-term treated cases and 17% in the short-term treated cases). In the total material of 122 infants born alive to long-term treated diabetics the neonatal mortality was 5 (4%); such a baby very seldom dies in the neonatal period.

TABLE III—FŒTAL MORTALITY * FROM 1926 TO SEPT. 30, 1955, CLASSIFIED BY TREATMENT IN 422 BABIES

Period	Treatment					
	Long-term		Short-term		Total	
	No. of babies	Fœtal loss	No. of babies	Fœtal loss	No. of babies	Fœtal loss
1926–45 ..	—	—	—	—	157	59 (38%)
1946–52 ..	58	7 (12%)	94	34 (36%)	152	41 (27%)
1953–55 ..	72	6 (8%)	41	11 (27%)	113	17 (15%)

* Stillbirths and deaths in first 10 neonatal days of babies weighing at least 1000 g. (2 lb. 3 oz.) at birth.

2 mothers died, but none in the last eighteen years.

How much can we hope to reduce this fœtal mortality? In our total series major congenital malformations leading to the baby's death before the 11th postnatal day amounted to about 3%. Moreover the perinatal mortality in Copenhagen is about 3% (Kærn 1955). (Perinatal deaths comprise stillbirths and deaths in the first week after birth of infants weighing at least 1000 g.) So perhaps a fœtal mortality of about 6% in pregnancy in diabetics might not be far from the mark.

Classification of Risk to Fœtus

To estimate the risk to the fœtus we use the well-known classification of White (1949). In our 1946–55 material of 265 cases 13 belong to class A with no fœtal mortality and 10 to class F with a fœtal mortality of 50%. Although the number of cases is small, this fits perfectly with White's classification. But table VI shows no pattern in mortalities of classes B, C, and D either in the long-term group (this might be due to our treatment) or in the short-term group. We feel that White's classification is a good one although not entirely satisfactory—Oakley (1953) thinks the same—but we have not yet succeeded in devising a better one.

Comparison with Other Treatments

It is appropriate to compare the results of our treatment with those of White (1949) and White et al. (1953) from the Joslin Clinic in Boston; those of Peel and Oakley (1949), Oakley (1953), and Peel (1954) in London; and the report to the Medical Research Council (1955).

As is well known, White and her colleagues are the pioneers in this field and have reported the largest personal series (White et al. 1953) and lowest fœtal mortality so far (10%). White's treatment consists in: (1) treatment of diabetes to achieve the best possible

TABLE IV—FŒTAL MORTALITY * FROM 1946 TO SEPT. 30, 1955, CLASSIFIED BY BIRTH-WEIGHT AND ACCORDING TO WHITE (1949) IN 265 BABIES

Classification	Treatment			
	Long-term		Short-term	
	No. of babies	Fœtal loss	No. of babies	Fœtal loss
Birth-weight :				
1000 g. (2 lb. 3 oz.) or more	130	13 (*10%*)	135	45 (*33%*)
2500 g. (5½ lb.) or more	117	9 (*8%*)	110	26 (*24%*)
White's classes :				
A, B, and C	74	5 (*7%*)	94	26 (*28%*)
D and F	56	8 (*14%*)	41	19 (*46%*)

* See footnote to table III.

chemical control; (2) measures to prevent or correct œdema and hydramnios; (3) sex-hormone therapy, intramuscular stilbœstrol and progesterone given daily in increasing doses throughout pregnancy; (4) early induction of labour, with cæsarean section in 70% of cases; and (5) special care of the infant.

White claims that her good results are due mainly to the prophylactic sex-hormone therapy. In one of their recent series (Nelson et al. 1953), consisting of 128 babies, weighing at birth 960 g. (2 lb. 1½ oz.) or more, observed in 1950–52, the mothers were seen once or twice a week during the latter half of pregnancy, most often simultaneously by the physician and the obstetrician. All the patients were admitted to hospital at the end of the 34th week (about 40 days before the calculated term) and remained in hospital until delivery. Patients with complications were admitted earlier. Class-A patients did not have hormone therapy and were allowed

TABLE V—FŒTAL MORTALITY * FROM 1946 TO SEPT. 30, 1955, CLASSIFIED BY BIRTH-WEIGHT AND RELATION OF DEATH TO LABOUR

Treatment	Death before labour, or of infants with birth-weight 1000–1550 g. (2 lb. 3 oz.–3 lb. 6 oz.)		Birth-weight 1600 g. (3 lb. 8 oz.) or more and baby alive at onset of labour		Total	
	No. of babies	Fœtal loss	No. of babies	Fœtal loss	No. of babies	Fœtal loss
Long-term	130	6 (*5%*)	124	7 (*6%*)	130	13 (*10%*)
Short-term	135	26 (*19%*)	109	19 (*17%*)	135	45 (*33%*)

* See footnote to table III.

to go to term. It was the intention to deliver all the other patients by the end of the 37th week, but 25% had to be delivered at the end of the 35th week or earlier.

The King's College Hospital series, consisting of 141 cases in 1949 (Peel and Oakley 1949) and 275 by June, 1953 (Oakley 1953), carried an unaltered over-all fœtal mortality of about 25%. The patients attended the diabetic clinic and were treated as outpatients. They were controlled by different, though fewer, doctors, but no attempt was made to bring the blood-sugar to the physiological level. Pregnancy was terminated between the 33rd and 38th weeks, and in 75% of cases cæsarean section was done (Oakley 1953). In 56 of 129 cases treated between 1949 and December, 1953, stilbœstrol and ethisterone were given by mouth (Peel 1954). This hormone therapy was not thought to reduce the fœtal mortality. Oakley and Peel have not reported their fœtal mortality classified according to the stage of pregnancy at which the patient first attended the clinic; but 18·5% of the infants born by cæsarean section died in the neonatal period (Oakley 1953).

The Medical Research Council's (1955) series was designed as a controlled trial of the value of giving stilbœstrol and ethisterone by mouth during pregnancy. The series comprises 136 viable infants distributed among nine centres. Apart from the hormone treatment and some general rules (termination of pregnancy between the 34th and 38th weeks by the method most desirable on obstetric grounds, and keeping the babies in oxygen

TABLE VI—FŒTAL MORTALITY * FROM 1946 TO SEPT. 30, 1955, IN WHITE'S CLASSES B, C, AND D

Treatment	White's classes					
	B		C		D	
	No. of babies	Fœtal loss	No. of babies	Fœtal loss	No. of babies	Fœtal loss
Long-term	41	2 (*5%*)	30	3 (*10%*)	50	4 (*8%*)
Short-term	44	18 (*41%*)	42	8 (*19%*)	37	18 (*49%*)

* See footnote to table III.

tents for at least 48 hours after birth) the treatment was not strictly regimented. The series was treated by different physicians, obstetricians, and pædiatricians. Half the mothers were given hormones by mouth during pregnancy, and the average stay in hospital before delivery was 2·3 weeks. The average weight of the babies at birth was about 3·2–3·3 kg. (7–7¼ lb.). The fœtal mortality (stillbirths and neonatal deaths within a month after delivery) was 25% in both groups.

Table VII compares the treatments given in Peel's 1949–53 series (Peel 1954), the Medical Research Council's (1955) series, the series of Nelson et al. (1953), and our long-term series. Two factors common to the treatments of the two series—that of Nelson et al. (1953) and our long-term series—with the lower fœtal mortality are: (1) one attending physician and good medical treatment during pregnancy ("treatment of every abnormality"); and (2) experienced obstetrical management and infant care by a few persons. To get a low fœtal mortality it is unnecessary to do a lot of cæsarean sections or to give sex hormones. We deliberately use the word "unnecessary" of sex-hormone therapy because we are not in a position to judge whether this treatment is possibly beneficial. To test this a controlled trial would have to be made with material having the lowest fœtal mortality by the classical treatment, and at present there does not seem to be any need for such a trial.

TABLE VII—COMPARISON OF SOME PUBLISHED SERIES

Series	Years	No. of cases	Fœtal mortality (%)	Treatment during pregnancy			Rate of cæsarean section (%)	No. of teams in obstetric and in infant care
				Sex hormones (% of cases)	Last months			
					Strict medical	No. of physicians		
Peel (1954)	1949–53	129	27	43	+	Few	75	One
Medical Research Council (1955)	?	136	25	50	+	Several	?	Several
Nelson et al. (1953)	1950–52	128	10	ab. 95	+ +	One	70	One
Present long-term treated series	1946–53	130	10	0	+ + +	One	18	One

Effect of Long-term Treatment

We are convinced that the decrease in total fœtal mortality in our series through years is due to our long-term treatment. Although expert obstetrical management is a *conditio sine qua non*, the main credit goes to the treatment during pregnancy, because the long-term and the short-term cases have had the same obstetrical care during delivery.

The main factors in our treatment are treatment by one physician, confinement to hospital for several weeks, and keeping down the blood-sugar level. The "one-physician close supervision" during the last months of pregnancy seems to be necessary to get a low fœtal mortality. As regards confinement to hospital we have to admit that, although treatment in hospital for a long period has been shown here to be superior to treatment for a short time, we have not tried to prove that such a period of treatment in hospital is superior to very close personal supervision of an ambulant patient (cf. White 1949).

Clearly, methods including close supervision of the pregnant will decrease the number of cases with precoma, lead to early treatment of toxæmia and other complications, and thus lower the fœtal mortality. In addition our long-term treatment has a strong effect on the baby: the long-term treated baby has a higher blood-sugar level (Pedersen 1952, Pedersen et al. 1954) and is smaller (Pedersen 1954b), the amount of amniotic fluid is smaller (Pedersen and Jørgensen 1954), and the long-term treated baby withstands labour better than does the short-term treated baby. On all points so far examined the long-term treated babies are more like normal babies. In contrast to this, the number of complications during delivery and the number of obstetrical procedures has not decreased in the long-term treated mothers compared with the short-term treated mothers (unpublished). The effect on the baby seems to be due either to the lowering of the mother's blood-sugar level for a long time or to unknown factors favourably influenced by this strict control of the diabetes—a control which can hardly be achieved outside a hospital.

We must conclude that the long-term treatment is a prophylactic procedure whose effect is to make the babies more like normal babies in different ways. At present we cannot tell exactly which mechanisms are involved, except that the metabolism of the fœtus must be more normal (Pedersen 1952).

Summary

The long-term treatment of pregnant diabetics is described.

By applying this treatment to 130 cases in 1946–55 the fœtal mortality was reduced to 10%; whereas in 135 short-term controls it was 33%, compared with 38% in 157 cases in 1926–45.

The total fœtal mortality in 265 cases in 1946–55 is steadily decreasing but varies according to the proportion of long-term to short-term treated cases.

At present, in the material of 1953–55, the total fœtal mortality is 15% in 113 cases; 64% of the cases belong to the long-term treated group and have a fœtal mortality of 8%. In these last 113 cases 17 cæsarean sections were done (15%).

Theoretically the lowest fœtal mortality achievable is at present about 6%.

To get a low fœtal mortality it is necessary to give intense medical treatment by one or a few doctors during pregnancy and to have access to one or a few expert obstetricians. It is unnecessary to give sex hormones or to do many cæsarean sections.

Our treatment is prophylactic, making the babies more like normal babies in different ways, especially as regards neonatal blood-sugar level, weight and length, volume of liquor amnii, and fœtal mortality.

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VITAMIN-A LEVELS IN IDIOPATHIC HYPERCALCÆMIA

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THE ætiology of the syndrome described by Lightwood (1952) as "idiopathic hypercalcæmia in infants with failure to thrive" is unknown, but it has been suggested that intolerance of vitamin D is the cause (Hutchison 1955). In view of the close association of vitamin A with vitamin D in nature, the plasma-vitamin-A levels in this syndrome were studied as part of an investigation into vitamin-A metabolism in infancy.

Material and Methods

The plasma-vitamin-A levels of 7 healthy children, 5 marasmic infants, and 8 infants with idiopathic hypercalcæmia were estimated before (fasting levels) and four hours after a large oral dose of vitamin A. 2 of the infants with idiopathic hypercalcæmia (cases 11 and 13) also had renal acidosis. The preparation of vitamin A used was synthetic vitamin-A palmitate in arachis oil ('Avoleum,' B.D.H.). The dose administered was 12,500 international units (I.U.) per kg. of body-weight up to a maximum of 250,000 I.U. One infant with idiopathic hypercalcæmia (case 12), however, was given 20,000 I.U. per kg. of body-weight. In a further 10 healthy children only the fasting plasma-vitamin-A levels were estimated. The patients received their ordinary diets, but no patient was given vitamin-A concentrates for at least forty-eight hours before the date on which the estimations were made. The term "fasting" has been applied to the plasma-vitamin-A

TABLE I—PLASMA-VITAMIN-A LEVELS IN HEALTHY CHILDREN

Child no.	Age	Weight (kg.)	Plasma-vitamin-A (I.U. per 100 ml.)			
			Fasting (duplicates)		4 hours after the standard oral dose of vitamin A (duplicates) *	
1	3 mos.	4·9	160	—	605	665
2	4 mos.	7·3	130	—	805	—
3	15 mos.	14·0	120	120	195	180
4	3 yr.	15·3	200	—	500	530
5	4 yr.	15·0	70	120	1250	1260
6	5 yr.	20·0	125	—	195	—
7	8 yr.	—	160	—	470	—
8	3 yr.	—	195	180	—	—
9	4 yr.	—	175	—	—	—
10	4 yr.	—	150	180	—	—
11	6 yr.	—	125	160	—	—
12	7 yr.	—	205	—	—	—
13	8 yr.	—	165	—	—	—
14	8 yr.	—	115	175	—	—
15	8 yr.	—	70	100	—	—
16	9 yr.	—	135	—	—	—
17	10 yr.	—	100	110	—	—

* The standard oral dose of vitamin A was 12,500 I.U. of vitamin-A palmitate in arachis oil per kg. of body-weight up to a maximum of 250,000 I.U. of vitamin A.

TABLE II—PLASMA-VITAMIN-A LEVELS IN MARASMIC INFANTS

Case no.	Disease	Age (mos.)	Weight (kg.)	Plasma-vitamin-A (I.U. per 100 ml.) Fasting (duplicates)		4 hours after the standard oral dose of vitamin A (duplicates)*	
1	Gastro-enteritis	1	3·1	95	110	165	150
2	Gastro-enteritis	2	3·6	50	—	415	—
3	Bronchitis	3	3·1	135	210	755	765
4	Mongol	4	4·0	Nil	—	Nil	—
5	Feeding disorder	4	2·6	130	115	105	100

* The standard oral dose of vitamin A was 12,500 I.U. vitamin-A palmitate in arachis oil per kg. of body-weight.

level after vitamin-A concentrates had been withheld for at least forty-eight hours.

The plasma-vitamin-A level was estimated by spectrophotometry by the method of Bessey et al. (1946) modified by the use of 2-ml. plasma samples and the substitution of benzene for the kerosene-xylene mixture used to extract the vitamin A from the plasma. The spectrophotometric readings were converted into I.U. of vitamin A by reference to a standard curve prepared from pure solutions of vitamin-A acetate in benzene.

Results

The results are shown in tables I, II, and III. The infants with idiopathic hypercalcæmia had higher fasting plasma-vitamin-A levels than either the infants marasmic from other causes or the healthy children; they also had higher plasma-vitamin-A levels four hours after the standard test dose. Cases 12 and 13 are exceptions, but beginning recovery from the disease may explain their normal results; they had been under medical supervision for four months and five months respectively, and

TABLE III—PLASMA-VITAMIN-A LEVELS IN INFANTS WITH IDIOPATHIC HYPERCALCÆMIA

Case no.	Age (mos.)	Weight (kg.)	Serum-calcium * (mg. per 100 ml.)	Plasma-vitamin-A (I.U. per 100 ml.) Fasting (duplicates)		4 hours after the standard oral dose of vitamin A (duplicates) †	
6	8	5·6	15·5	245	280	3590	3480
7	14	6·3	15·3	280	430	940	905
8	11	7·0	15·2	225	210	1320	1365
9	8	6·6	15·1	365	435	1720	1810
10	4	5·4	14·8	355	355	3230	3375
11	10	5·8	13·5	255	—	1215	—
12‡	9	5·5	13·3	160	155	605	595
13	7	6·5	12·4	120	235	975	1095

* The serum-calcium levels were estimated within a few days of the plasma-vitamin-A levels.
† The standard oral dose of vitamin A was 12,500 I.U. of vitamin-A palmitate in arachis oil per kg. of body-weight.
‡ This patient was given 20,000 I.U. of vitamin A per kg. of body-weight.

both were starting to thrive when their vitamin-A levels were estimated.

The plasma-vitamin-A levels of the infants with idiopathic hypercalcæmia were compared by statistical methods with the corresponding levels of the healthy children. These calculations showed that both the fasting levels and the levels four hours after the standard test dose were significantly higher in the infants with idiopathic hypercalcæmia. The mean plasma-vitamin-A levels are shown in table IV. The calculations were made only on the duplicate estimations to eliminate the variations between children—e.g., a variation from an average value of 3545 I.U. per 100 ml. of plasma four hours after the standard test dose in one infant with idiopathic hypercalcæmia to 600 I.U. per 100 ml. of plasma in another.

Discussion

Aron (1949) has shown that the plasma-vitamin-A level of a healthy person is kept almost constant despite variations in the dietary intake of the vitamin. He considers that this is due to the existence of a mechanism for controlling the level of vitamin A in the plasma, and that the liver plays an important rôle in this regulatory process. In apparently healthy infants a high oral intake of vitamin A daily for several weeks will raise the plasma-vitamin-A level, but this returns to normal within a few days of reducing the intake to that contained in a normal diet (Josephs 1944). None of the infants with idiopathic hypercalcæmia in the present series had a high vitamin-A intake immediately before the date on which the estimations were made; hence vitamin-A overdosage was not responsible for the high fasting plasma-vitamin-A levels of these infants. Various

TABLE IV—MEAN PLASMA-VITAMIN-A LEVELS
(Calculations made only on duplicate estimations)

—	Plasma-vitamin-A (I.U. per 100 ml.) Fasting	4 hours after the standard oral dose of vitamin A*
Infants with idiopathic hypercalcæmia..	275	1786·1
Healthy children	130·6	648·1

* The standard oral dose of vitamin A was 12,500 I.U. of vitamin-A palmitate in arachis oil per kg. of body-weight up to a maximum of 250,000 I.U. of vitamin A.

diseases are associated with alterations in the plasma-vitamin-A level, which is low in febrile states (Clausen and McCoord 1938, Lindquist 1938) whereas it is high in chronic nephritis and in the nephrotic syndrome (Clausen and McCoord 1938). Idiopathic hypercalcæmia appears to belong to this group of diseases. Aron (1949) has suggested that such diseases interfere with the mechanism normally responsible for maintaining a constant plasma-vitamin-A level.

McCoord et al. (1948) showed that, after a standard oral dose of vitamin A, the rise in the plasma-vitamin-A level of malnourished infants is smaller than in healthy infants. This finding has been confirmed in the present investigation. It contrasts with the greater than normal rise observed in the infants with idiopathic hypercalcæmia. The height to which the plasma-vitamin-A level rises after a large oral dose of vitamin A must depend on the rate of absorption and the rate of storage. It is impossible, however, to determine from the present data whether there is increased absorption or diminished storage of vitamin A in idiopathic hypercalcæmia.

A disorder of vitamin-A metabolism similar to that found in idiopathic hypercalcæmia has been described in the nephrotic syndrome (Kagan et al. 1950). Moore and Sharman (1951) have drawn attention to this and to other evidence which appears to connect urinary diseases with vitamin-A deficiency and with abnormalities of vitamin-A metabolism. It is of interest, therefore, that idiopathic hypercalcæmia, in which renal calcinosis sometimes develops, provides a further example of this association.

Since vitamins A and D are both fat-soluble, an abnormal vitamin-A metabolism in idiopathic hypercalcæmia is a further indication that vitamin-D metabolism may be abnormal in infants who develop this syndrome.

Summary

In 8 cases of idiopathic hypercalcæmia the plasma-vitamin-A levels were estimated before, and four hours after, a standard oral dose of vitamin A. The results

show that vitamin-A metabolism is abnormal in idiopathic hypercalcæmia.

I wish to thank Prof. Stanley Graham and Dr. J. H. Hutchison for much helpful advice and criticism and for permission to study patients treated in their wards; Mr. W. M. Dennison for permission to study patients treated in his wards; Dr. Ellis C. Wilson, in whose laboratory this work was done, for his interest and helpful advice; and Dr. R. A. Robb, of the mathematics department of the University of Glasgow, for the statistical calculations.

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POTASSIUM-CHLORATE POISONING WITH OLIGURIA

TREATED BY THE BULL RÉGIME

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IN 1882 Riess noticed unusual globules and granules in the erythrocytes of a patient who died of renal failure after swallowing about 30 g. of potassium chlorate. Similar bodies were described by Heinz (1890) in animals poisoned with acetylphenylhydrazine.

Potassium chlorate is still used medicinally as a local antiseptic, either as a solution or as lozenges for sore throats and oral ulcers. Poisoning is rare nowadays but may follow a single large dose or repeated small doses.

Witthaus (1911) collected 143 examples, of which 116 were fatal. He noted that poisoning was usually accidental, but he recorded 15 examples of suicide, of which 2 may have been accidental, and 3 of homicide.

Cochrane and Smith (1940) reported a patient with nephritis who died of renal failure following ingestion over three days of 30–35 g. of potassium chlorate dispensed in error for potassium chloride.

Gordon and Brown (1947) described yet another example in which death was due to renal failure.

A. R. Cushny (Grollman and Slaughter 1947) noted that death in subacute poisoning resulted from renal failure.

The following example illustrates the toxic effects of potassium chlorate and the value of the Bull régime in the treatment of the associated oliguria.

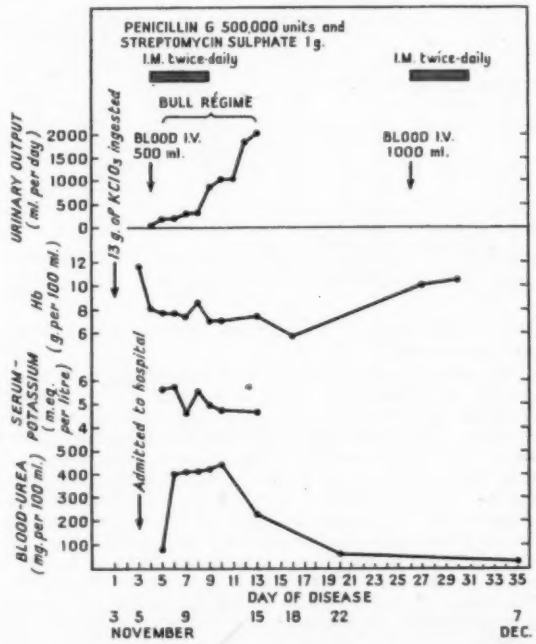
Case-report

A caretaker, aged 54, with a past history of chronic bronchitis, was admitted to hospital on Nov. 5, 1954. Two days previously a frænal ulcer had developed to which he had applied during an hour or so about 13 g. of potassium chlorate. This he had obtained from his chemist. He had not followed the pharmacist's instructions to wash out his mouth and had swallowed the crystals. The same night anorexia, nausea, and a burning retrosternal pain developed. He noticed that he was blue and that his urine and stools were dark. There was no past history of jaundice, but he had been a moderately heavy drinker of spirits and beer.

On admission he was ill, with signs of acute bronchitis and pyrexia (99°F). There was no trace of the frænal ulcer, but there was gross pyorrhœa. He was jaundiced but not cyanosed, and his liver was enlarged to the umbilicus and tender. His spleen was impalpable, and there was no purpura. Clinically the cardiovascular and nervous systems appeared to be normal (blood-pressure 130/85 mm. Hg).

Laboratory Investigations.—Examination of his blood showed Hb 11·5 g. per 100 ml. and leucocytes 30,000 per c.mm. (neutrophils 92%). Abnormal leucocytes were not seen. The erythrocytes showed bizarre fragmentation, considerable polychromasia, and numerous Heinz bodies in wet preparations. Spectroscopy of the serum showed an absorption band at 624 mμ typical of methæmalbumin; and Schumm's test showed the formation of a hæmochromogen with an absorption band at 558 mμ. The serum-bilirubin level was 5 mg. per 100 ml. The urine contained a moderate amount of protein, scanty red and white cells, numerous granular and cellular casts, and traces of hæm pigments, bilirubin, and urobilin. These various features pointed to a Heinz-body hæmolytic anæmia due to potassium chlorate.

Treatment and Progress.—The severe coincident bronchitis responded satisfactorily to a five-day course of penicillin G 500,000 units daily and streptomycin sulphate 1 g. given intramuscularly twice daily. Twenty-four hours after admission oliguria developed, which was treated with the protein-free high-calorie diet of Borst (1948) and Bull and Joekes (1949). Through an intragastric tube an emulsion of 100 ml. of arachis oil in a litre of 40% glucose with gum acacia q.s. was given daily. Fluid equivalent to the previous day's output of urine and vomit was added. Intravenous therapy was not attempted, and neither alkalis nor potassium salts were given by mouth. Vitamin-B complex was given as 'Becosyn' 2 ml. intramuscularly daily, and special attention paid to oral hygiene. For the next few days the patient remained very ill with persisting oliguria and jaundice (see table and figure). Intravascular hæmolysis continued, and his Hb decreased from 11·5 g. to 7·9 g. per 100 ml. in the first twenty-four hours following admission. Next day he was therefore given a transfusion of 1 pint of stored blood from which the plasma (and in it much of the red-cell potassium) had been removed. An electrocardiogram on the following day did not show any evidence of hyperkalæmia. For several days his condition remained critical. He continued to vomit, and his blood-urea level rose to over 400 mg. per 100 ml.; but his electrolyte balance remained satisfactory, and his jaundice began to fade about the seventh day of the illness. The urinary output rose steadily, and on the thirteenth day the intragastric drip was discontinued. By then the jaundice had gone and liver-function tests were normal. On the sixteenth day the liver edge was no longer palpable and urinalysis was



Blood analysis and urinary output.

BIOCHEMICAL DATA AND BLOOD-PRESSURE

—	Day of disease																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	16	20	27	30	35
Hb (g. per 100 ml.)	..	..	11·5	8	7·7	7·7	7·4	8·7	7·1	7·1	..	..	7·4	5·9	..	9·9	10·5	..
Urea (mg. per 100 ml.)	..	..	..	..	80	400	410	410	420	440	..	..	230	..	56	..	..	30
Serum-sodium (m.eq. per litre)	..	..	..	..	137·5	137·5	137·5	145	140	137·5	..	..	137·5	..	..	..	..	..
Serum-chloride (m.eq. per litre)	..	..	..	..	103	104	104	107	105	105	..	..	106	..	..	..	..	..
Serum-potassium (m.eq. per litre)	..	..	..	..	5·6	5·7	4·6	5·5	4·9	4·75	..	..	4·6	..	..	..	..	..
Plasma-bicarbonate (m.eq. per litre)	..	..	..	..	26·2	25·7	22·3	28·5	23·2	21·4	..	..	27	..	..	..	..	..
Serum-bilirubin (mg. per 100 ml.)	..	..	5·0	4·8	5·0	..	..	..	..	0·2	..	..	0·2	..	..	..	..	..
Urine (ml. daily)	..	..	..	60	190	210	300	330	840	1020	1020	1830	2070	..	..	..	..	..
Vomit (ml. daily)	..	..	..	45	120	480	600	..	..	..	..	..	..	..	..	..	..	..
Total output of fluid (ml. daily)	..	..	..	105	310	690	900	330	840	1020	1020	1830	2070	..	..	..	..	..
Fluid intake (ml. daily)	..	..	..	1400	1200	900	1300	1300	1050	1980	1980	1200	2130	..	..	..	..	..
Blood-pressure (mm. Hg)	..	..	..	130/85	135/85	135/70	110/70	110/70	130/70	130/70	..	..	..	..	..	..	..	..

normal. At no time did the serum-potassium level rise above 6 m.eq. per litre (normal = 4–5 m.eq. per litre). The blood-urea level was 56 mg. per 100 ml. on the twentieth day. Since the anæmia still persisted (Hb 8·6 g. per 100 ml.) and Heinz bodies and fragmented red cells were still present, the patient was given a further transfusion of 1000 ml. of packed red cells, which increased his Hb to 10·4 g. per 100 ml.

Convalescence was complicated by a recurrence of acute bronchitis and by a deep-vein thrombosis in the left calf, from both of which he recovered rapidly. He went home thirty-three days after admission, and when seen again a month later he was very well. His blood-urea level was then 35 mg. per 100 ml. and Hb 13·3 g. per 100 ml., and his erythrocytes were morphologically normal.

Discussion

The fatal dose of potassium chlorate varies greatly. A. R. Cushny (Grollman and Slaughter 1947) said that 1 g. had proved fatal in a child, whereas adults had swallowed 40–50 g. without developing serious symptoms; he remarked that poisoning was more likely in nephritics than in healthy people. Witthaus (1911) stated that the minimum lethal dose was 12 g. for an adult, 5 g. for a child, and 1 g. for an infant.

The toxic effects of orally administered potassium chlorate are due to three distinct causes:

(1) A non-specific local action characterised by immediate nausea, vomiting, and mild diuresis.

(2) The effect of the potassium ion on the myocardium, leading to hypotension, bradycardia, heart-block, and, in fatal cases, ventricular fibrillation.

(3) The effect of the chlorate ion, which denatures Hb with the production of Heinz bodies, and lyses the erythrocytes. This reduces the oxygen-carrying capacity of the blood. The hæm of the Hb thus liberated becomes attached to serum-albumin, forming the brown pigment methæmalbumin (Fairley 1941), which is probably excreted as bilirubin by the liver. Part of the liberated Hb may be excreted unchanged in the urine.

The mass destruction of red cells has consequences similar to those found in the syndrome variously known as pigment nephrosis, transfusion kidney, tubovascular syndrome, and renal anoxia syndrome (Maegraith et al. 1945). Potassium chlorate is metabolised slowly, and about 90% is excreted unchanged in the urine (Grollman and Slaughter 1947). It thus remains in the body during any period of anuria and continues hæmolysis.

Acute potassium-chlorate poisoning has therefore a very characteristic course. It begins with an attack of vomiting, followed by transient cyanosis due to the formation of Heinz bodies. The onset of hæmolysis is rapid, and the consequent anæmia and jaundice are severe by the third day, when Hb, bilirubin, and urobilin are present in the urine and the risk of anuria is greatest. Hæmolysis is likely to continue for several days, even after the flow of urine has been restored.

Potassium-chlorate intoxication thus provides another example of oliguria due to renal damage. Bigby and Avery Jones (1949), Bull and Joekes (1949), and Discombe (1954) have all emphasised that patients with this form of acute oliguria usually recover, provided that they are not given potassium salts, and that overloading of the circulation with parenteral infusions of saline solution, glucose, sucrose, or sodium sulphate is avoided. Evans et al. (1953) have pointed out that hyperkalæmia is the common cause of death, and that it is due to the breakdown of endogenous intracellular protein. This process is accelerated by pyrexia, infection, and semi-starvation, and is minimised by the prevention and cure of secondary infection and by providing a protein-free high-calorie diet (Bull 1955). These principles were successfully used in treating the present patient. Since at no time did his serum-potassium level rise above 6 m.eq. per litre, ion-exchange resins in the sodium cycle, as advocated by Evans et al. (1953), were not used. The anæmia, which may further impair renal function, was treated with transfusions of packed red cells. Removal of the potassium-rich plasma lessened the danger of hyperkalæmia and averted disturbance of the fluid balance. Control of the patient's respiratory infection and oral sepsis was achieved by systemic chemotherapy. In retrospect such high dosage was not required in the presence of poor renal function. 1 mega-unit of penicillin G given intramuscularly daily is all that is required (Bull 1955). Efforts to promote renal activity with oral potassium citrate and parenteral infusions were avoided because they are useless and indeed dangerous (Discombe 1954).

Summary

A case of Heinz-body hæmolytic anæmia following the accidental ingestion of potassium chlorate is reported.

The hæmolysis persisted for twenty days and was complicated by oliguria lasting nine days.

Potassium-chlorate poisoning is yet another cause of renal damage with oliguria best treated by the Bull régime.

I wish to thank Dr. K. P. Ball for permission to publish and for his encouragement; and Dr. George Discombe and Dr. Clifford Hoyle for invaluable advice and criticism in the preparation of this paper.

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Reviews of Books

Sigmund Freud: Life and Work

Vol. II. *Years of Maturity 1901–1919.* ERNEST JONES, F.R.C.P. London: Hogarth Press. 1955. Pp. 534. 30*s*.

WHEREAS a bad biographer adds a new terror to death, a good one assists towards immortality. Much of Freud's published work and some one-sided recollections had created in people's minds a figure remote from the attractive, reserved, complex man of genius whom Dr. Ernest Jones is now portraying for us with great skill and fullness. The present volume describes the steadier yet troubled years in which Freud felt sure of his way, despite the painful schisms which gradually separated him from Jung, Adler, and Stekel. These defections led to the formation of a committee of stalwarts, a secret council of trustworthy defenders of the citadel, to each of whom Freud gave an intaglio ring. Dr. Jones was the founder of this committee and in many other ways was at the centre of the psycho-analytic movement. His contact with Freud was always close and unmarred by the doubts and rifts which were so distressing a feature of many of the personal relationships he describes with penetrating candour. His portrait therefore has the authenticity derived from intimate acquaintance and access to much correspondence, as well as from the imaginative and intellectual sympathy of a devoted pupil and helper.

The present volume is in three sections. The first is a straightforward narrative of what happened to Freud and psycho-analysis from 1901 until the end of the first world war. The second is an organised survey of the voluminous writings in which Freud carried further his clinical and theoretical conceptions and applied them in diverse fields such as anthropology and literature. The third section describes his mode of life and his character: inevitably it repeats much that has already appeared in the two volumes, but the full-length sketch of Freud as a man rounds out the total picture.

Dr. Jones has a great subject and ample materials; in his dignified, restrained account it is easy to see with what admiration and devotion he has approached his task.

Land and People in Nigeria

K. M. BUCHANAN, B.A., professor of geography, Victoria University College, Wellington, New Zealand; J. C. PUGH, M.A., lecturer in geography, University College, Ibadan. London: University of London Press. 1955. Pp. 252. 35*s*.

THE subtitle of this book is the Human Geography of Nigeria and its Environmental Background, and the book has been written round 172 maps, mostly drawn by Professor Buchanan and Mr. Pugh, which clearly illustrate the physical features of the country, the pattern of the population, agriculture, forests, mining and industry, transport, and the public and social services. The information has been derived from published and unpublished material (largely from government sources) and from field observations made by the authors. The direct medical interest lies in 19 pages on the prevalent diseases, and 2 pages on the medical services. They could have been expanded to the advantage of the general reader.

For instance, though it is stated that the epidemics of cerebrospinal fever are related to cold, dryness, wind, and dust, the mode of transmission—which make these factors important—is not described. Similarly no account is given of the mode of spread of leprosy, relapsing fever, undulant fever, schistosomiasis, and onchocerciasis. Guineaworm is related to water, but not in a manner which would be instructive to a water-engineer.

The rest of the book is a detailed account of geography, in its wide sense, and because in most countries—and especially in Africa—the physical characters of the country, and the resulting economic and cultural background, strongly affect its diseases, this lucid account, rather than the short medical section, should prove invaluable to medical administrators and research-workers who adopt the biological and ecological approach to the study of disease advocated by Sir Macfarlane Burnet and others.

One of the most important functions of a doctor is to make sure that changes in environment which may seem advantageous from the economic point of view are not carried out at the expense of health; another is to stimulate the proper people to change an environment when it is deleterious to health. This book will help doctors to discharge both these responsibilities, and they will not find the information so attractively set out elsewhere.

Modern Trends in Obstetrics and Gynæcology

2nd series. Editor: KENNETH BOWES, M.D., F.R.C.O.G., obstetric physician, St. Thomas's Hospital, London. London: Butterworth. 1955. Pp. 394. 60*s*.

THIS is in no sense a second edition. Of the 26 chapters, nearly all are on subjects different from those covered in the first series. It does not, therefore, attempt to be comprehensive; but in each chapter the busy specialist will find, in a well-condensed form, the important recent contributions to knowledge which should influence modern clinical practice. The fact that ten of the chapters are by authors who are not themselves obstetricians or gynæcologists is a good indication not only of the scope of the book but also of the increasing importance to each specialty of work in related fields. We hope that further series will be published from time to time because this volume, like its predecessor, correlates in a very helpful way the more academic and fundamental researches with the practical applications which arise from them.

Problèmes de structures, d'ultrastructures, et de fonctions cellulaires

Published under the direction of J. ANDRÉ THOMAS, professeur de biologie cellulaire à la Sorbonne. Paris: Masson. 1955. Pp. 358. Fr. 3300.

THE articles in this volume are amplifications of ten lectures given at the Sorbonne during the spring of 1954. They deal with the applications of the physical and biological sciences to the problems of cellular biology. They are perhaps too specialised for the general reader but they will be of value to those who can read them critically.

J. Barraud briefly summarises the information to be obtained from classical and X-ray crystallography and goes on to consider crystal growth, the biosynthesis of proteins, and the theories concerning the rôle of desoxyribonucleic acid in this latter process. R. Wurmser describes the elucidation of the active groups on enzyme molecules and the nature of the forces which attract the substrate molecules to it. He also discusses the application of thermodynamics to this study and the process of electron transfer in the cytochrome complex. L. R. Rey, in his paper on the structure of the desoxyribonucleic acid molecule, gives prominence to the recent work of the X-ray crystallographers but does not neglect the earlier work on the anomalous viscosity, birefringence, diffusion, electrophoretic mobility, sedimentation, and other physical properties.

D. G. Dervichian reviews some of the theoretical structures of cell membranes and describes the kinetics of active and passive penetration. Ch. Devillers discusses cellular adhesion and morphogenesis. He describes investigations on the nature of the adhesive substances, the changes brought about by simple molecules and ions, and their relation to morphogenesis. René Couteaux, in his article on inter-tissue junctions, describes the structure and function of nerve sheaths and various motor and sensory nerve end-organs.

A. Fessard's description of the ultrastructures and functions of the neurone is mainly concerned with the evidence obtained with the electron microscope. Tracings obtained with intracellular electrodes are rather elegantly displayed alongside photomicrographs showing the electrodes in position. The paper of Ch. Oberling and W. Bernhard is devoted exclusively to the electron micrography of cancer cells. C. Thibault describes recent work done on the survival of spermatozoa and the conservation of their fertility. He deals with the protective effect of egg-yolk, milk, and other diluters, and the rôles of oxygen, temperature, and antibacterial drugs in conserving fertility. Finally, R. Coujard describes the pioneer work of Reilly and his own interesting experiments on "sympathetic" lesions.

Relief of Symptoms

WALTER MODELL, F.A.C.P., associate professor of clinical pharmacology, Cornell University Medical College. Philadelphia and London: W. B. Saunders. 1955. Pp. 450. 56*s*.

IT is perhaps true, as Dr. Modell believes, that, with the great advances in curative medicine, the relief of the patient's distress has come to be neglected. Certainly, the proper use of symptomatic treatment calls for skill and judgment, and this book provides useful help. It is written informally and readably, and reflects the wide practical experience of its author.

The opening chapters discuss the general principles involved in the relief of symptoms, and they contain much sound advice. Important symptoms are then dealt with individually. A final chapter describes the uses of cortisone and gives warning of its danger as a masker of symptoms. There is a refreshing clarity and briskness in the writing.

As a pharmacologist, the author is able to speak with authority about the use of drugs, and he mentions many substances recently introduced. It is interesting to note that heroin receives little attention, either in the chapter on cough or elsewhere.

Arthroplasty

ST.J. D. BUXTON, F.R.C.S., consulting orthopædic surgeon to King's College Hospital. London: Pitman Medical Publishing Co. 1955. Pp. 126. 30*s*.

WRITING in an easy and direct style, Mr. Buxton gives an excellent historical review of the work on arthroplasty of all joints over the past fifty years; but it is only where the hip is concerned that he goes into sufficient detail to be of real help to the orthopædic surgeon. He was one of the first in this country to make extensive use of the 'Perspex' femoral head; experience of this operation dates only from 1950 and recent reports on the late results, at least in this country, have shown that the durability of the perspex head is much less than had at first been hoped. The pendulum is now swinging back towards the old operations, such as McMurray's osteotomy and Girdlestone's pseudarthrosis, where the maintenance or creation of a mobile hip is essential, and the indications for the Judet procedure are becoming relatively restricted.

Nevertheless, this is an interesting monograph which will be enjoyed by many. It is excellently produced and embellished with illustrations of the highest class; and there are very useful chapters on rehabilitation and record charts.

Applied Medical Bibliography for Students

WILLIAM DOSITE POSTELL, medical librarian and professor of medical bibliography, Louisiana State University School of Medicine, New Orleans. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1955. Pp. 142. 32*s*. 6*d*.

SOME instruction in the use of libraries, much of it informal, has been given in America and in this country for many years, but there are very few medical schools in which medical bibliography has managed to win its own little corner in the curriculum. Mr. Postell, a librarian of great experience, has embodied the substance of his lectures on this subject into a book which medical students (and indeed all users of medical libraries) may read with interest and profit.

The book starts with an account of the evolution of medical literature, which includes an excellent chapter on the history of medical periodicals. Information is then given on the arrangement of the library, the catalogue, some of the classification schemes in common use, basic reference works, bibliographical tools, and the periodical collection. The final part contains advice on medical writing and on the principles of bibliographical citation.

There are few questionable statements of fact; but it is wrong to say that most of the earlier printed books were on parchment or vellum, and the author is also mistaken in his belief that a sheet folded four times is known as a quarto and one folded eight times as an octavo. The information concerning the *Medical Directory* is out of date and the list of bilingual medical dictionaries is inadequate.

A more serious criticism is that Mr. Postell does not always seem to know whether he is writing for the student of medicine or for the student of librarianship. Thus, the instructions regarding alphabetisation in catalogues may mislead the medical reader into expecting uniformity in treatment which he will certainly not find in practice. Much of the space devoted to medical writing could have been more profitably given to certain forms of literature (such as government publications, theses, reprints, and congresses) which present special difficulty to the inexperienced reader. A more precise evaluation of some of the reference sources mentioned, and hints on the extent and peculiarities of the "literature" in the special departments of medicine would have added considerably to the value of the work. The procedure for looking up references on subjects such as tuberculosis or cancer is quite different from that for the "rare" diseases; but distinctions of this kind are not mentioned.

The difficulty of seeing the problems of bibliographical research from the reader's point of view is very great, and although the author has compressed much valuable information and advice into a short book it can hardly be said that he has reached the heart of the matter.

Die Hand des Kranken

Prof. Dr. MAX BURGER, Direktor der medizinischen Universitätsklinik, Leipzig. Munich: Lehmanns. 1956. Pp. 445. DM. 37.

TO doctors, as to artists, the hand must always be of interest, for it has much to tell the discerning physician. Professor Burger has done good service in collecting so much of value in this unusual and stimulating book.

He has not limited himself to mere lists of pathological states of the hand, though there can be few if any of these that he has overlooked. He has also described the normal hand, its anatomy and physiology, and added many interesting sidelights on such things as finger-prints, palmistry, and even the deaf-and-dumb language. In his description of disorders and abnormalities of the hands he gives brief accounts of the general diseases underlying them, and the many bodily changes in which the hand takes part. The book is beautifully illustrated by some 200 pictures, mostly photographs, and these alone tell a remarkable story of the manifold diseases of the hand.

No-one reading this book will fail to find much of interest in it—perhaps much that he has not known before.

Thallium Poisoning

J. J. G. PRICK, professor of neurology and psychiatry, University of Nijmegen; W. G. SILLEVIS SMITT, professor of neurology, University of Utrecht; L. MULLER, industrial physician, Enschede, The Netherlands. Amsterdam: Elsevier. London: Cleaver-Hume Press. 1955. Pp. 155. 19*s*.

THALLIUM is the active principle of many rat poisons and is easily obtainable. In Great Britain all thallium salts are schedule-1 poisons and their sale is strictly controlled, but on the Continent thallium is rapidly superseding arsenic as the most common means of murder by poisoning. This monograph was written because the symptoms and signs of thallium poisoning are not well known.

The symptoms are acute gastro-intestinal upsets followed by signs of renal damage and peripheral neuritis. If death does not occur in the acute stage, the peripheral neuritis progresses rapidly and baldness occurs after about twelve to fourteen days. A butterfly-shaped seborrhœic rash may develop on the face, and semilunar-shaped areas of discoloration of the nails may be seen.

Professor Prick and his colleagues include in this useful study accounts of clinical cases, necropsy findings, and the results of animal experiments. The photographs of patients and photomicrographs of pathological tissue are of a high standard.

Chirurgie du corps thyroïde

SYLVAIN BLONDIN, chirurgien de l'Hôpital Beaujon. Paris: Masson. 1955. Pp. 292. Fr. 2600.

THIS book is one of a series of surgical monographs edited by Professor Mondor. The text is based throughout on the author's personal experience, sustained by a review of the literature which appears rather sketchy so far as British and American authors are concerned. Operative procedures are described, though not in great detail. The author has a strong preference for the use

of local anæsthesia. The greater part of the book is concerned with the indications for operation and the management of its complications. The common clinical conditions are well described, but the illustrations are indifferent.

Recent Advances in Neurology and Psychiatry (6th ed. London: J. & A. Churchill. 1955. Pp. 311. 30*s*.).—In the ten years that have elapsed since the previous edition neurology has made many advances. Under the editorship of Sir Russell Brain and Dr. E. B. Strauss this book has been entirely rewritten, and three extensive chapters included on electro-encephalography by Denis Hill, neuroradiology by David Sutton, and intracranial tumours by Douglas Northfield. The references at the end of each section are numerous and recent, and the authors have shown good judgment in selecting the papers that deserve special notice. The exposition is concise and to the point. As the preface rightly states, the common ground between neurology and psychiatry increases in importance. This is well illustrated in the chapter on consciousness and unconsciousness, and that dealing with the parietal lobe. Unfortunately another relevant chapter, on the mental aspects of the frontal lobe, falls below the standard maintained in the rest of the book.

Biographical Memoirs of Fellows of the Royal Society (Vol. 1. London: The Royal Society. 1955. Pp. 263).—The Royal Society has started a new series in continuation of the *Obituary Notices of Fellows of the Royal Society* which covered the years 1932–54 in nine volumes. This first group contains 19 biographies of varying length, including those of Sir Stafford Cripps and Albert Einstein, all written by distinguished colleagues. Each is accompanied by a photograph and a bibliography of published works. Some of the portraits show the remarkable artistry of Karsh of Ottawa. The biographies are of so high a class that they could be bettered only by a full-scale book about each fellow. Three are of particular interest to the medical reader: Frederic Wood Jones and Arthur Keith by Sir Wilfrid Le Gros Clark and Edward Mellanby by Sir Henry Dale. They reawaken admiration for the accomplishments of each of these men in such wide fields.

New Inventions

A BED CRANE

THE crane illustrated here was made for a patient who had severe paralytic poliomyelitis in 1949 and was left with flaccid paralysis of both legs and weakness of the muscles of her trunk and right upper arm. For six years she could not lift herself out of bed into her wheel-chair or on to a bedpan without help.

Mr. James Genet, senior orthopædic technician at Wellington Hospital, designed the crane to give the patient much greater independence, particularly when getting to and from her bed and wheel-chair. He has successfully achieved this and considerably improved her morale.

The apparatus consists of a frame clamped on to the end of the bed and incorporates an ordinary motor-car hydraulic jack, which the patient works with the handle, jacking herself up off the bed or the wheel-chair. She then very easily moves herself over to the wheel-chair or the bed and lowers herself by turning the handle which decompresses the jack.

The crane can also be used by nurses to lift patients off beds and on to wheel-chairs and, if the sanitary type of chair is used, for taking them to the lavatory or to a shower where they can be washed, thus obviating the difficulties of bathing, particularly in the case of heavy elderly patients.

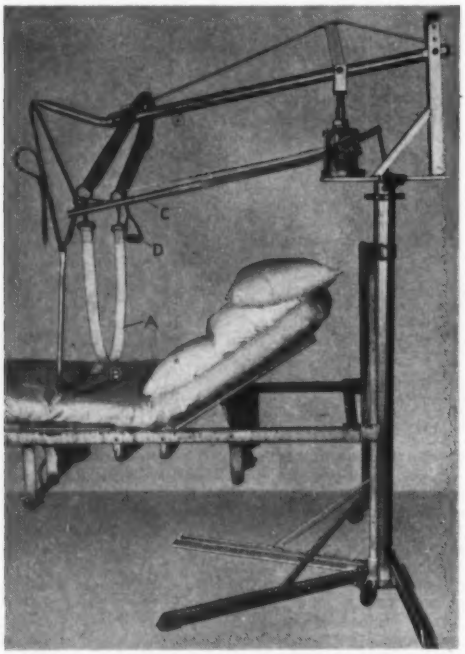


Fig. 1—The crane in position: A, sling to pass under arms and around patient's back; B, sponge-rubber and leather-covered hook to pass under patient's knees; C, operating handle of jack; D, hand-grip which is control for raising or lowering the patient and is working handle for C in certain positions. To lift patient, handle is pushed fully in towards jack by giving hand-grip a quarter-turn and pumping. To lower, hand-grip is turned until handle is pulled about $\frac{1}{2}$ inch out of jack; handle is then pressed down as far as possible. Slinging is so arranged that front strap runs over roller on spreader; this action transfers patient from partly prone position on bed to sitting position on wheel-chair. A stop prevents patient from swinging too far.

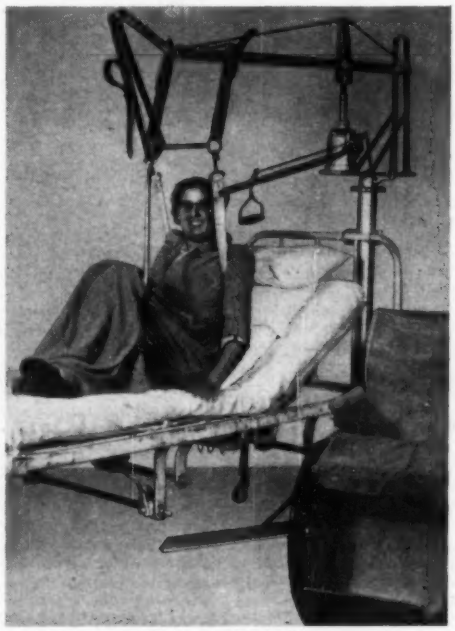


Fig. 2—Patient in sling.

This apparatus cost about £23 to make. The price compares very favourably with that of other apparatus on the market. The apparatus can be made mobile by being fitted with castors; future models will be so fitted.

Mr. Genet feels that it is wrong to patent apparatus of this kind and it is therefore available for any hospital to copy.

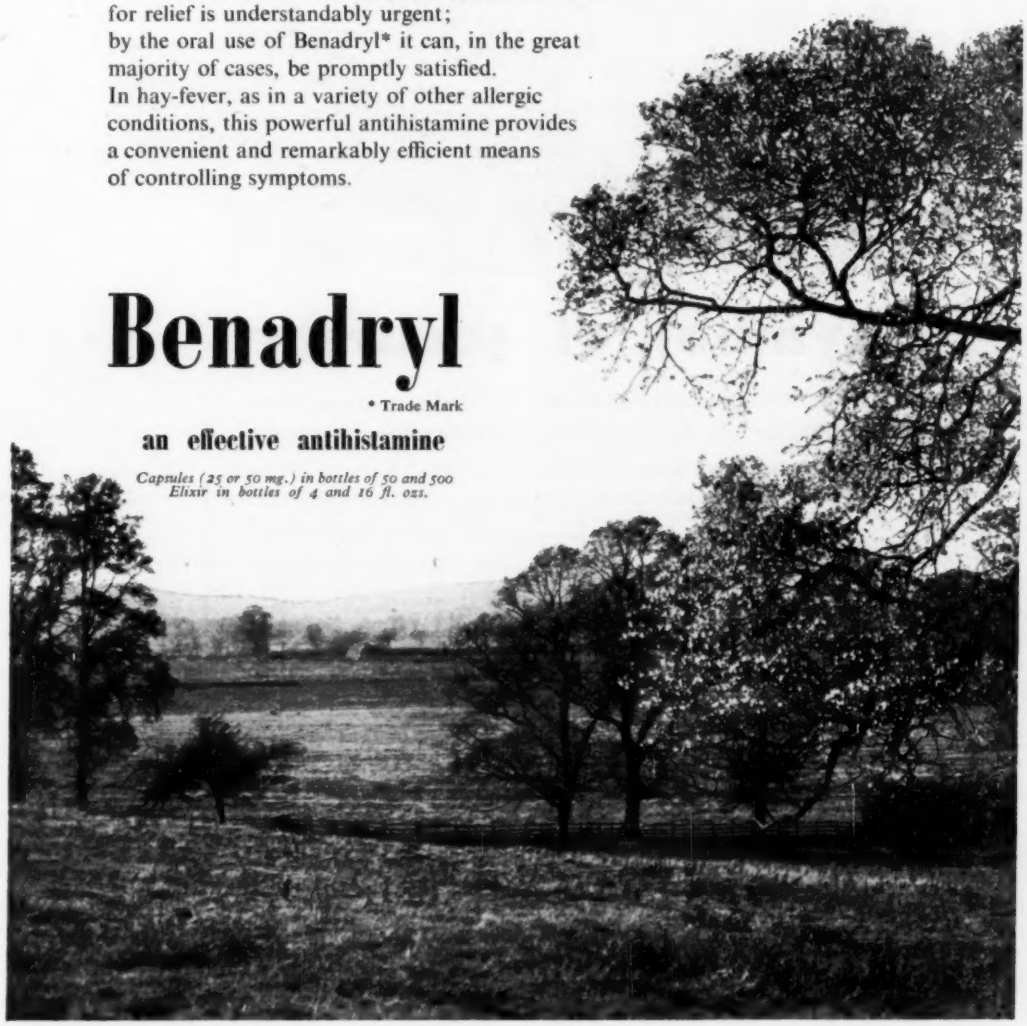
Wellington Hospital, New Zealand

I. A. M. PRIOR
M.D. N.Z., M.R.C.P., M.B.A.C.P.

Nothing so active is as that which least seems so

Francis Thompson

A peaceful countryside scene: but an active source of intense discomfort for all those susceptible to hay-fever, for now is the time of the year when invisible air-borne pollens begin to take their toll. Incapacitated by continual weeping, sneezing and nasal congestion, the hay-fever patient's desire for relief is understandably urgent; by the oral use of Benadryl* it can, in the great majority of cases, be promptly satisfied. In hay-fever, as in a variety of other allergic conditions, this powerful antihistamine provides a convenient and remarkably efficient means of controlling symptoms.



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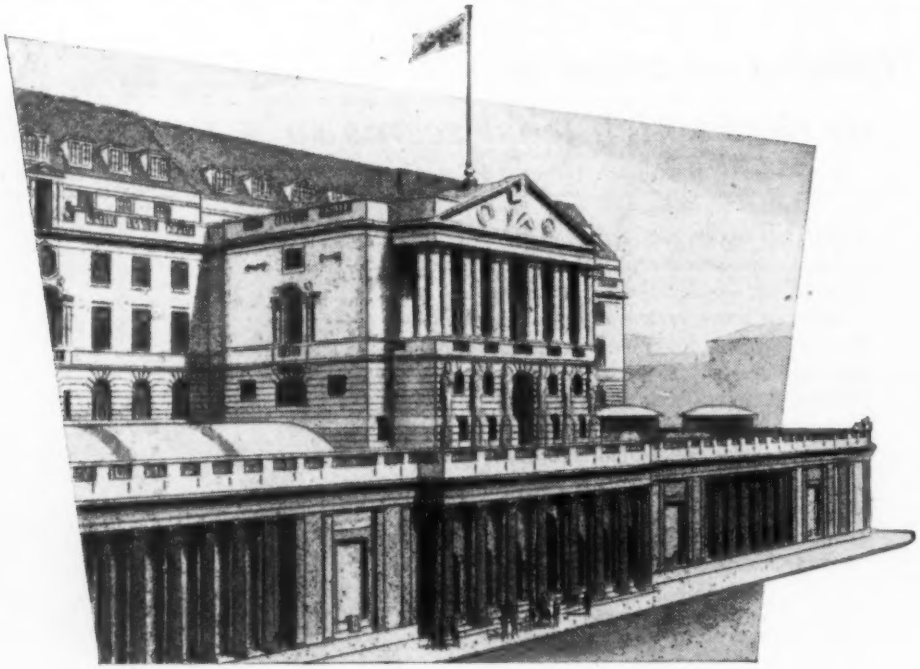

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THE LANCET

LONDON: SATURDAY, MAY 5, 1956

Freud

SELDOM has one man been so incontestably the creator of a new field of thought as FREUD was of psycho-analysis. Whether we accept it as a profound new science or doubt it as a far-fetched speculative system, we must wonder at the massive and daring product of one fertile original mind, working with intense concentration through more than forty years. Now, a century after FREUD's birth, there is still dispute about the value of his achievement, but hardly about the force of its impact on contemporary thought. It can be said of him (as it was of another notable disturber of pleasant illusions concerned, in part, with the sexual impulse) that he dug into the mine of truth, bringing up ore mixed with dross, to such purpose that he did not leave opinion where he found it: his theory provided "a ground on which to fix the levers that may move the world."

Psycho-analysis is, of course, not only a theory but also a therapy. It took its origin in efforts to cure hysteria, and almost all its medical expositors and investigators have been dependent on the practice of psychotherapy as a source of evidence and experience, and generally as a means of livelihood. This has influenced the development of the subject, and its critical study. Whether the effect has, on the whole, been for the good of psycho-analysis as a branch of medicine is hard to say. No-one has succeeded in amassing statistical evidence that it is more effective in the treatment of neurotic or other mental illness than other methods, though in the opinion of many people statistics has not the final say in this matter. FREUD himself saw some of the inherent obstacles to statistical evaluation—small numbers of patients, heterogeneity in form and severity of illness, mutability of technique, premature termination of treatment—and he asserted that in any case the therapeutic aspect of psycho-analysis was not the most important.

It is one of the many paradoxes in FREUD's career that he was deeply indebted to his medical training yet rejected it in retrospect: "I have never really been a doctor in the proper sense. I became a doctor through being compelled to deviate from my original purpose; and the triumph of my life lies in my having, after a long and roundabout journey, found my way back to my earliest path." It is impossible to tell what he would have done if his training had been in philosophy or in psychology, as psychology was then. What seems clear is that his earliest researches, in neural structure, the action of cocaine, aphasia, and the paralyses of children, confirmed him in habits of minute observation, organisation of diverse material, deduction, and lucid expression which served him well in the bolder studies that occupied his mature years. In this matter he was unjust to his own achievement, and his self-estimate erred on the romantic side: "I am not really a man of science, not an observer, not an experimenter and not a thinker. I am nothing but by temperament a Conquistador—an adventurer if you want to translate the word—with the curiosity, the boldness and the tenacity that belongs to that type of being." His excursions into fields of human endeavour remote from clinical medicine derived from his overmastering desire to understand human nature. Medicine gave him, in psychotherapy, the springboard; from it he plunged into literature, sculpture, history, and anthropology, seeking always to find the ulterior meaning of men's conduct and the motives of creative action. In these audacious forays cautious deduction, which his teacher BRÜCKE had once commended in him, was a quality hard to find: he took risks and made mistakes, as any amateur must. But these counted for little, when set against the stir he caused, the incitement to fresh inquiry, the lively light cast into dull-seeming corners and neglected depths. Our ideas about education, religion, crime, and many other human concerns have been shaken about by the impact of this restless, penetrating, subtle mind. Techniques of which FREUD had no inkling or for which he would have no sympathy are now being deployed to test the validity of his theories and suggestions, not only in dynamic psychology and psychiatry, but in the social sciences at large.

It is appropriate that FREUD's centenary should be commemorated with especial regard in this country; for it was here that FREUD came as a young man (on a journey that he said had a decisive influence on his whole life), here that he thought of settling, and here that he found refuge when driven from Vienna by the Nazi occupation. He probably owed some pregnant ideas to 19th-century English thinkers—notably JOHN STUART MILL and HUGHLINGS JACKSON—and he found in an English disciple his faithful and gifted biographer. Though his work transcended frontiers, and was accepted in some other countries, particularly the United States, more readily and eagerly, nowhere more than here can there be respect for the courage and intellectual integrity which led FREUD along strange paths, on a noble and endless quest.

Methionine and Hepatic Cirrhosis

THE mental disturbances that may be associated with hepatic cirrhosis include clouding of consciousness, confusion, apathy, personality changes, abnormalities in behaviour, and, finally, delirium and coma.[1] Signs may appear in the motor system, such as spasticity, increased limb reflexes, involuntary movements, and a peculiar flapping tremor [2] consisting of a series of rapid flexion-extension movements at the wrist and metacarpophalangeal joints, best demonstrated with the arms outstretched and fingers separated. It is important to appreciate the diffuse nature of the cerebral disturbances and their connection with liver disease, since, as SHERLOCK and her colleagues have pointed out,[3] the patient may all too easily be admitted to a mental hospital before the true diagnosis is reached.

These complications arise in patients with hepatic cirrhosis who have large collateral channels between the portal and systemic venous systems, and they

1. Walshe, J. M. *Quart. J. Med.* 1951, **20**, 421.
2. Sherlock, S., Summerskill, W. H. J., White, L. P., Phear, E. A. *Lancet*, 1954, ii, 453.
3. See *Ibid*, 1955, i, 1023.

may develop after a surgical portacaval anastomosis if hepatic function is impaired; but shunting of portal blood into the systemic circulation in the presence of a healthy liver does not produce the syndrome. Neurological and mental changes may also appear as the result of the severe liver damage which occasionally follows virus hepatitis. Clearly hepatic function must be depressed before this condition can arise, and its onset is precipitated by the development of communications between the portal and systemic veins. Moreover, the neurological disorders can be induced by raising the intake of nitrogenous substances, such as dietary protein, ammonium salts, and urea. Methionine, which has in the past been used in the treatment of liver disease, may have a similar effect,[4–7] and SHERLOCK and her associates have investigated the mechanism of this action.[8] Methionine given by mouth produced neurological deterioration in 7 out of 9 patients who had previously had episodes of impending hepatic coma. It was without effect in other patients with hepatic cirrhosis who had never had neurological complications. The rise in the blood-methionine level was the same in the two groups. Intravenous methionine had no effect in 3 patients who had previously relapsed after oral administration and in 1 it produced only a delayed exacerbation. No significant change in blood ammonium, pH, or bilirubin level accompanied the neurological deterioration produced by methionine. When chlortetracycline (aureomycin) was given at the same time as methionine, no toxic disturbances developed in patients who had previously reacted, despite the fact that higher blood-methionine levels were reached when the antibiotic and amino-acid were given together. These observations suggested that the toxicity was not due directly to methionine but to some substance derived from methionine by the action of intestinal bacteria sensitive to chlortetracycline. Bacteriological studies showed that the fæcal flora of patients with liver disease and neurological disturbances was no different from that of healthy people and of patients with uncomplicated cirrhosis. Methionine by itself did not alter the bacterial composition of the fæces. Chlortetracycline produced similar changes in all three groups—namely, a rise in proteus with elimination of bacteroides and an inconstant fall in *Escherichia coli*. The streptococcal types changed and lactobacilli increased.

The breakdown product of methionine responsible for the neurological changes has not so far been identified. Clearly, however, methionine is potentially toxic if given by mouth to patients with hepatic cirrhosis. In the past methionine has been recommended on rather slender grounds as a treatment of liver disease, but there is no definite evidence that it does any good, and its use should certainly be abandoned. Chlortetracycline has already been given with apparent success in the treatment of hepatic coma.[9] The neurological disturbances that may appear spontaneously in cirrhosis of the liver vary greatly in severity, and the effect of treatment is difficult to assess accurately; but SHERLOCK et al.'s clinical impression is that chlortetracycline therapy is of benefit in spontaneous hepatic coma. Other measures must of course be used—in particular, curtailment of the intake of protein and other nitrogenous substances during the acute phase of the disturbance.

4. Watson, C. J. *Ann. intern. Med.* 1949, **31**, 405.
5. Kinsell, L. W., Harper, H. A., Giese, G. K., Morgan S., McCallie, D. P., Hess, J. R. *J. clin. Invest.* 1949, **28**, 1439.
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7. Phear, E. A., Sherlock, S., Summerskill, W. H. J. *Ibid*, 1955, **i**, 836.
8. Phear, E. A., Ruebner, B., Sherlock, S., Summerskill, W. H. J. *Clin. Sci.* 1956, **15**, 93.
9. Farquahar, J. D., Stokes, J., Whitlock, C. M., Bluemle, L. W., Gambescia, J. M. *Amer. J. med. Sci.* 1950, **220**, 166.

Hypoglycæmia in Diabetics

WHENEVER hypoglycæmia in a diabetic cannot be attributed to one of its usual causes—failure to eat, over-exertion, or too much insulin—other possibilities must be considered. The blood-glucose comes from the alimentary tract or from the liver by glycogenolysis or gluconeogenesis. Poor absorption may cause hypoglycæmia in myxœdema[1] and sprue,[2] and glycogenolysis is deficient in some types of hepatic failure, even without other obvious signs of liver disease.[3] The liver may fail because it contains too little glycogen or because it is unable to mobilise stored glycogen as in von Gierke's disease, and possibly in the type of brittle diabetes with hepatomegaly recently described by EVANS and his colleagues.[4] Gluconeogenesis is largely dependent on the adequate function of the adrenal cortex and thus indirectly of the anterior pituitary. The association of diabetes with Addison's disease and Simmonds's disease is admittedly uncommon[5 6]; but early recognition of adrenal insufficiency in a diabetic is particularly important, for these patients become extremely sensitive to insulin, in the same way as the Long cat[7] or the Houssay dog,[8] and hypoglycæmia may well be fatal before the true state of affairs is appreciated.[9] Such a diabetic, previously needing much insulin, may be able to do without any at all, although an intravenous glucose-tolerance test will still show a diabetic curve. After infarction of the anterior pituitary for example, there is characteristically a severe headache followed in a day or two by hypoglycæmic reactions to the usual doses of insulin.[10] If the patient survives, and insulin treatment is either drastically curtailed or stopped, signs of hypofunction of the gonads and thyroid gradually appear, but they respond well to replacement treatment. Diabetic intercapillary glomerulosclerosis (Kimmelstiel-Wilson syndrome) may sometimes be associated with decreasing insulin needs,[11] but no satisfactory explanation has been suggested. RUNYAN et al.[12] concluded that the renal lesions were not related to any change in insulin needs.

The importance of hypoglycæmic episodes in prognosis lies in the susceptibility of the brain to what may be irreversible damage.[13] The risk is greatest after long-continued severe hypoglycæmia and in

1. Wilder, R. M., Foster, R. F., Pemberton, J. *J. Endocrin.* 1934, **18**, 455.
2. Landmann, H. R. *Amer. J. digest. Dis.* 1952, **19**, 110.
3. Mellinkoff, S. M., Tumulty, P. A. *New Engl. J. Med.* 1952, **247**, 745.
4. Evans, R. W., Littler, T. R., Pemberton, H. S. *J. clin. Path.* 1955, **8**, 110.
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6. Balfour, W. M., Sprague, R. G. *Amer. J. Med.* 1949, **7**, 596.
7. Long, C. N. H. *Harvey Lect.* 1936–37, **32**, 194.
8. Houssay, B. A. *New Engl. J. Med.* 1936, **214**, 971.
9. Caughey, J. E., Garrod, O. *Brit. med. J.* 1954, **ii**, 554.
10. Harvey, J. C., Klerk, J. *Amer. J. Med.* 1955, **19**, 327.
11. Zubrod, C. G., Eversole, S. L., Dana, G. W. *New Engl. J. Med.* 1951, **245**, 518.
12. Runyan, J. W. jun., Hurwitz, D., Robbins, S. L. *Ibid*, 1955, **252**, 388.
13. Jones, G. M. *Amer. J. med. Sci.* 1947, **213**, 206.

patients with coexisting cerebral arteriosclerosis [14]; but it should also be borne in mind with less severe attacks in younger individuals.[15] Experimental [16] and clinical [17] pathologists have been able to demonstrate organic cerebral damage, and psychiatrists have detected mental deterioration, using intelligence tests and electro-encephalography,[18] after repeated hypoglycæmic episodes. This is certainly a danger to be weighed against the advantages that can be attributed to long-term strict diabetic control, which for this reason should not be expected to attain chemical standards of normality.[19] SOMOGYI attributes [20] some of the wide and seemingly spontaneous swings in blood-sugar in so-called "brittle" diabetics to the hyperglycæmic reactions to episodes of hypoglycæmia, and to the tendency to treat these hyperglycæmic peaks with more insulin. The increasing reliance on single daily injections of long-acting insulins has increased the risk of hypoglycæmia not only because errors of overdosage are concentrated into single injections, but because the blood-sugar is often at its lowest during sleep (especially with protamine zinc insulin), when prompt treatment is unlikely. For this reason it is probably unwise to give insulin in single long-acting injections to a patient who needs large doses, especially if his insulin needs are known to be variable. And this is also why patients on long-acting insulins are advised to take bedtime snacks containing a proportion of protein to sustain the blood-sugar longer than would be possible with isocaloric amounts of carbohydrate.

When hypoglycæmic attacks occur in hospital confirmatory evidence is often sought from the blood-sugar, and not uncommonly this is found to be unexpectedly high,[21] thus casting doubt on the assumption that hypoglycæmia was the cause of the symptoms. The situation is complicated because, by the time the blood is withdrawn, the patient may be in the phase of rebound hyperglycæmia attributed to adrenaline-induced glycogenolysis. Indeed many of the classical symptoms of hypoglycæmia may be traced to adrenaline, for diabetics taking ganglion-blocking methonium compounds may slip into hypoglycæmic coma without such warning manifestations.[22] Vasoconstriction due to the release of catechol amines may serve to intensify hypoglycæmic symptoms by adding an element of anoxia to a perhaps already impaired cerebral circulation. Thus vasodilator drugs have been shown to improve hypoglycæmic manifestations when given without sugar.[23] If the blood-sugar level is falling very rapidly then the brain may be shorter of glucose than is suggested by a blood-sugar which seems relatively normal.[24] JOSLIN [25] was one of the first to draw a parallel between the effects of hypoglycæmia and those of anoxia. Different parts of the brain are involved in the same sequence, and both processes have the same end-result of reducing cerebral metabolic activity, since glucose, even in the untreated diabetic, is the only fuel burned by the brain. Thus it is that chronic mild cerebral anoxia may promote the development of clinically apparent hypoglycæmia, just as coronary atheroma may give rise to typical anginal pain during mild hypoglycæmia.[26] JONES [13] has described as "hypoglycæmic encephalopathy" the cerebral damage following hypoglycæmic attacks; thereafter the brain may be more liable to similar attacks even at higher blood-sugar levels.[21] The surest confirmation that an attack is hypoglycæmic lies in its response to intravenous glucose.

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24. Conn, J. W. *J. Amer. med. Ass.* 1947, **134**, 130.
25. Joslin, E. P. The Treatment of Diabetes Mellitus. Philadelphia, 1928; p. 49.
26. Murdock, T. P. *Conn. St. med. J.* 1951, **15**, 1064.

Annotations

THE WELFARE OF SPASTICS

THE organisation of a national scheme for the welfare of children and others suffering from cerebral palsy was curiously neglected in this country until after the second world war. In 1946, at a meeting in the London School of Hygiene and Tropical Medicine, the British Council for the Welfare of Spastics was formed with a broad basis of representation from medical, educational, and other professional interests. The aims of the council were to act as a central advisory and coördinating body for all activities directed to the well-being of spastics; to assist in the early ascertainment and classification of spastics, and in establishing schools and clinics; to promote research; and to help the parents of spastics by publishing informative books and pamphlets. As time went on, the council established useful contacts with voluntary bodies abroad, especially in Australia and the United States, and they coöperated successfully with the Ministries of Education and Health in plans for training staff in the best known methods of education and social welfare. The council's initiative helped in the establishment of residential and day schools, and they were closely concerned with the setting up of regional and local parents' associations. In this and many other ways they broke new ground; but lack of funds and a certain reluctance, not uncommon in professional bodies, to engage in widespread appeals to parents and the public made progress rather slow and formal.

The parents of spastic children, however, once their imagination had been fired, were in a hurry. They were not content to jog along under professional guidance; they were determined to take the wheel themselves. In this ever-growing enthusiasm a number of parents, spastics, and their friends began to press for an immediate improvement of the conditions under which children suffering from cerebral palsy were receiving education, medical care, and the special forms of speech training and physiotherapy which have proved so valuable. The National Spastics Society was formed in 1952 and immediately began to form parents' associations on a nation-wide scale. The brilliant publicity campaign organised by the central body through the press, the wireless, and the theatre still further stimulated the enthusiasm of parents and the formation of local associations, and large sums of money were collected by house-to-house visitation. The National Spastics Society have in fact scored a resounding success, and honour is due to them for their courage and resourcefulness.

Nevertheless, the situation has its own embarrassments: in the process of the campaign the essential problems of the spastic have been oversimplified, and

there is a risk that the claims for what can be accomplished, mentally and physically, for the spastic have been too optimistic. There has been a tendency to regard the solution too much in terms of finance, of bricks and mortar rather than plodding and dispassionate scientific study. Money is, of course, of immense importance in this unusually difficult and costly programme; and it may well be that the British Council for the Care of Spastics, with its more professional membership, has failed to appreciate the sense of urgency, enthusiasm, and passionate vigour of the National Spastics Society.

At any rate, surely the time has come for an effective working compromise—for the union of the cautious, objective, professional approach of the council with the lively strength of the "parents" movement. To have a permanent division means duplication and overlapping—for example, in having separate medical advisory committees; and this must lead to rivalry and a competitive spirit at the expense of the real welfare of spastics. This view was taken by the Archbishop of Canterbury, and it has been supported by the director-general of the National Society, Lieut.-Commander Ian Henderson, apparently to his own discomfiture. The main principle at issue is the question of where ultimate control should lie. The articles of association of the National Spastics Society hold the provision that not less than two-thirds of the members of the executive committee must be spastics or parents of spastics. The British Council has always had parents on its committee, but it is mainly representative of medical, educational, and other professional bodies which are deeply interested in the subject. National interests should take precedence over local demands, and there is a very real need for balance and judgment.

FORM OF CONSENT

IN law, a patient must not be examined or treated unless consent has been given. The question is seldom raised in the law-courts, for consent is usually taken for granted; but the principle is obviously a sound one, and its neglect can be dangerous. Except in an emergency, when prompt action is essential, consent is always obtained before operation or the giving of an anæsthetic; but specific permission is less regularly sought before investigations which the doctor is apt to regard as routine. An intradermal tuberculin test on a child is an example of a minor procedure which it is unwise to undertake without the agreement of parents; indeed tests of this nature, and prophylactic injections, are seldom done by local-authority doctors without it. Clearly, the need for permission is greater where the patient is a child; but adults, too, are entitled to a careful explanation of the investigation or treatment proposed. Consent by word of mouth, in the presence of a witness, is acceptable in law, but a written declaration is, of course, legally safer. On the other hand, an "omnibus" form of consent, couched in general terms, may be open to strong objection; for the purpose of getting consent is to be sure of the patient's approval of something he has genuinely understood.

This subject was discussed recently by a hospital management committee [1] whose medical advisory committee recommended the introduction of a special consent form. The form had particular reference to investigations and tests which adult and child patients might require; and we understand that the immediate reason for the request was the (highly commendable) proposal to Mantoux-test all children on admission. The management committee, however, were reluctant to grant powers of examination and investigation on so wide a scale, and decided to defer decision until at least they had seen suggested forms of consent drawn up by the medical committee after consultation with an appropriate medicolegal organisation. The publicity given to their discussion of this important issue may stimulate other management committees to review their own arrangements, in collaboration with their medical committees. The safeguarding of doctors against unreasonable litigation can be important; but even more important is the safeguarding of patients against investigation or treatment they do not desire. The good relationship of patient and doctor, in hospital or elsewhere, depends on confidence, which should be founded as firmly as possible.

1. *Crystal Palace Advertiser*, March 1, 1956.

EXIT PLOMBAGE?

BEFORE chemotherapy tilted the balance of opinion in favour of resection, thoracoplasty was regarded as the best major operation for the treatment of pulmonary tuberculosis. The results indeed were good, and the gross demolition of the upper thorax that was necessary to secure them was viewed tolerantly by clinicians though less so by patients. Chemotherapy has radically changed all this, and past standards have slipped into the discard so rapidly that many stoutly held principles have had to be revised and established methods subjected to searching review.

Apical plombage was *not* an established method before the introduction of chemotherapy, but it had been tried with some success in America by Wilson.[1] The initial idea was that the introduction of an inert plastic substance into the extrapleural space would overcome the disadvantages inherent in extrapleural pneumothorax, and at the same time leave the patient with an intact chest wall. Complications, however, as reported by Trent et al.[2] and Walkup and Murphy,[3] were far too many and serious, particularly as regards pressure phenomena, to warrant the continued use of the operation, and the plomb was then placed extraperiosteally where it could do less damage to the lung and great vessels; the periosteum, after separation from the ribs, formed with the attached intercostal muscles a protective barrier between the plomb and these vital structures, and results became more encouraging. Soon it appeared that, except when the apex of the lung was grossly adherent, apical plombage would constitute a serious rival to thoracoplasty and even bid fair to replace it as the main surgical measure. Early results were good,[4–6] particularly as new and more suitable plastic materials were forthcoming; surgeons and patients alike were pleased with the one-stage no-deformity operation which had so few post-operative complications; and chemotherapy at first seemed to confirm these impressions by rendering the disease less active at the time of operation, thus further diminishing the risk of complications. But the well-known hazards of the permanent retention of a foreign body in the tissues were not to be so easily overcome. Infection sometimes revealed itself early, when it was usually staphylococcal; more often it appeared late, and it was then commonly due to the tubercle bacillus.[7] Ruefully, the infected plombs were removed and thoracoplasty performed to close the space. The main cause for concern is that infections continue to become manifest some years after operation and it is this factor which completely undermines confidence. Meantime, resection in the increasingly favourable conditions produced by more thorough preoperative chemotherapy has rapidly

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2. Trent, J. C., Moody, J. D., Hiatt, J. S., McCann, N. C. *Ibid*, 1949, **18**, 173.
3. Walkup, H. E., Murphy, J. D. *Dis. Chest*, 1949, **16**, 118, 456.
4. Bing, J. *Acta chir. scand.* 1950, **100**, 293.
5. Morriston Davies, H., Temple L. S. Stathatos, C. *Thorax*, 1951, **6**, 209.
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gained favour, ousting plombage and largely replacing thoracoplasty.

The present position of plombage has been reviewed by Jackson and McCann.[8] Although in their series of 203 operations in 191 patients, infection was relatively uncommon compared with some other reported series, they nevertheless conclude that the problem of preventing such infection remains unsolved and that the trend of surgery in pulmonary tuberculosis is towards removal of the tuberculous focus rather than its collapse. They still advocate plombage in certain circumstances (for example, for patients in whom resection is considered unwise and thoracoplasty dangerous, and for those with bilateral disease where the conservation of the greatest possible respiratory function is essential). It is also of value at times in thoracoplasty, the plomb being removed at the second stage. Time will tell whether long-term chemotherapy is not a better line of treatment in patients who are doubtful surgical risks, but the indications even for resection appear to be contracting; for plombage, many think, they have already disappeared, particularly since modified one-stage thoracoplasty [9–11] is being perfected, which offers most of the advantages of plombage without its dangers.

PROGNOSIS IN ADDISON'S DISEASE

FEW therapeutic advances in recent years have been more impressive than the development of endocrine therapy in Addison's disease. A condition which was almost inevitably fatal a quarter of a century ago now promises to be compatible with a normal lifespan.[12] As Dunlop [13] pointed out, there have been four eras in the treatment of this disease. In the first era (1849–1930) there was no really effective treatment. The average length of survival in tuberculous cases was only just over a year from the onset of symptoms; in simple atrophy it was just under three years. Only a few patients survived for a number of years—the longest recorded survival being eighteen years [14]—and one or two recovered partially or even completely.[15 16] The second era opened with the introduction of Swingle and Pfiffner's cortical extract.[17 18] This produced immediate benefit but the long-term results showed little improvement; 23 of Dunlop's 30 patients still died within one year of diagnosis. Using Swingle's extract continuously, with a high intake of salt, Rowntree [14 19] was able to keep 5 out of 8 patients alive and well for an average of ten years from the onset of symptoms; and 4 were still alive in 1955, having survived an average of nearly seventeen years. 2 of these 4 patients had received additional deoxycortone acetate for four and ten years respectively, and the other 2 had had small doses of cortisone during the past three years.[15]

The third era extended from the introduction of deoxycortone in 1938 [20 21] to the use of cortisone in 1950. Thorn [22] reported that 48% of a group of 158 patients survived for an average of ten years under treatment with deoxycortone—supplemented from time to time with whole adrenal extract—whereas before 1930 50% had succumbed within one year. Many of the patients were maintained in good general health with regular implantations of deoxycortone pellets, and the use of cortical extract during crises; but they remained unduly susceptible to infections, many of which proved fatal.

The fourth therapeutic era opened with the introduction of cortisone as a regular medication, and of intravenous hydrocortisone in crises. This so much improved the prognosis that Thorn et al. think that "at present the well-supervised patient with Addison's disease should have a nearly normal lifespan." [12] Good supervision, in their view, involves imposing on patients conditions similar to those commonly applied to diabetics. Not only should they receive regular cortisone and deoxycortone, but they should carry emergency supplies of cortisone acetate tablets and suspension, deoxycortone in oil, and sodium chloride capsules. Thorn et al. also recommend that each patient should carry a card giving (*a*) the diagnosis; (*b*) the name, address, and telephone number of his doctor and next-of-kin; and (*c*) instructions to give the patient 25 mg. cortisone acetate by mouth—or 100 mg. intramuscularly—if found collapsed, and to notify his doctor immediately. Patients should also be instructed to take an extra 50–100 mg. cortisone daily in the presence of infection, and likewise to notify their doctor. A supply of a broad-spectrum antibiotic might well be added to this "iron ration" of cortisone and deoxycortone which Thorn et al. recommend.

Only by regular supervision, and by education of the patients and the profession along these lines, will unnecessary deaths be avoided and patients given the best chance of a full lifespan.

EXTRADURAL HÆMATOMA

THE mortality of traumatic extradural hæmorrhage is high: Spurling [23] put it at from 30 to 50% in large centres in the United States. Schneider and Tytus,[24] of Ann Arbor, have recently analysed some of the factors in the high death-rate, and Lewin,[25] in a Hunterian lecture some years ago, studied the problem in detail. The classical clinical development of middle meningeal hæmorrhage and the need for operation have been recognised since the descriptions of Percivall Pott,[26] Jacobson,[27] and Hutchinson,[28] but by no means all patients present the typical picture. Lewin analysed 34 cases admitted between 1940 and 1949 to the Radcliffe Infirmary and the Military Hospital for Head Injuries, and in 20 the illness conformed to the classical description, with minor variations. The head injury may be slight without loss of consciousness (as in 7 of Lewin's cases) and it is often a blow on the temple; but sometimes (in 9 patients in this series) the head injury is severe and there is no lucid interval of recovered consciousness before cerebral compression develops. In this group diagnosis may be difficult, since the signs of cerebral compression appear on a background of cerebral contusion. Considerable importance is usually given, in the diagnosis of extradural hæmorrhage, to dilatation of the ipsilateral pupil, later followed by changes in the opposite pupil; but in nearly half Lewin's patients there were no abnormal ocular signs, and they should be regarded as a late and inconstant feature of the condition. A unilaterally dilated and inactive pupil following a head injury may be due to traumatic mydriasis or injury of the oculomotor nerve, but in these conditions the pupillary abnormality will be present from the time of the injury. When the pupil dilates as the result of

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extradural hæmorrhage, it indicates that a tentorial pressure cone is developing and the patient's condition often deteriorates very rapidly.

As Lewin emphasises, a localised bruise or laceration of the scalp is a very useful guide in identifying which side a hæmatoma is on; in 21 of his patients there was a local injury over the hæmatoma. He stresses the importance of careful examination of the scalp, and the search should be repeated on the operating-table after the whole head has been shaved. In most cases there is radiological evidence of a fracture overlying the hæmatoma, though occasionally there is none.[29 30] X-ray examination may also show displacement of a calcified pineal body, and this is of course most valuable evidence of a hæmatoma. But even a centrally placed pineal body does not exclude a hæmatoma, since in Lewin's series there were 2 patients with central pineals; in each the extradural hæmatoma was in an unusual site, one in the posterior fossa and the other under one frontal lobe. Most extradural hæmorrhages are in the temporal regions but occasionally they may be found, as in these 2 cases, in the posterior fossa or under the frontal lobes; and this is one of the main reasons for the high mortality, since the accurate diagnosis of bleeding in these sites may be very difficult. Lumbar puncture is not a great help in diagnosis and has the very definite danger of precipitating a tentorial pressure cone; puncture was performed in 13 of Lewin's patients and in 5 the pressure was normal. It is by no means certain why the pressure is normal in the presence of a large extradural clot, but it is important to realise that it may be so; otherwise the possibility of a hæmatoma may be dismissed in spite of a suggestive clinical picture. Schneider and Tytus [24] drew attention to another pitfall in diagnosis: when there is profuse cerebrospinal rhinorrhœa or otorrhœa after a head injury extradural hæmorrhage may produce very little immediate signs of rising intracranial pressure.

As Lewin observes, the important clinical pointers to the presence of a hæmatoma are deterioration in the level of consciousness once improvement has begun, the onset of symptoms and signs of cerebral compression, and the development of fresh neurological signs.

COÖPERATION IN TREATMENT OF CANCER

THERE has in recent years been a good deal of discussion about the best methods of securing coöperation between physicians, surgeons, and radiotherapists in cancer treatment. In many centres the days are passing when a patient with cancer tends to be treated rather by the method most familiar to the first specialist he sees than according to his need; but the resources for investigation and treatment still differ widely between one hospital and another. Joint cancer consultation clinics are greatly aiding selection and combination of treatment and, through joint follow-up clinics, have provided valuable opportunities for specialists to see what can be achieved by methods other than those in which each is expert. A further advantage has been the concentration of clinical material and specialist experience for teaching purposes.

In 1944 an interesting experiment on these lines was organised by the Royal Marsden Hospital (then the Royal Cancer Hospital). Joint cancer consultation clinics had been set up within the hospital just before the war and these were later extended to include other hospitals, starting with the Brompton Hospital for Diseases of the Chest and the Chelsea Hospital for Women, its immediate neighbours with which there had been a long unofficial association. By 1945 these clinics had been extended further to include the Moorfields, Westminster, and Central Eye Hospitals, and the Royal National Throat, Nose, and Ear Hospital. For four years the Royal Free Hospital coöperated in the scheme until its own radiotherapy department was re-established, and another arrangement existed with the Princess Beatrice Hospital until it became part of the Westminster Hospital group. At present the group of hospitals running joint cancer consultation clinics consists of the Brompton Hospital for Diseases of the Chest; the Chelsea Hospital for Women; Fulham Hospital; Moorfields, Westminster, and Central Eye Hospitals; the Metropolitan Ear, Nose, and Throat Hospital; the National Hospital, Queen Square (together with the Atkinson Morley Hospital and the neurosurgical unit of the Hospital for Sick Children, Great Ormond Street); the Royal National Throat, Nose, and Ear Hospital; the Royal Sussex County Hospital; St. Mary Abbot's Hospital; St. Peter's, St. Paul's, and St. Philip's Hospitals; St. Stephen's Hospital; and the West End Hospital for Nervous Diseases.

Over 1000 patients a year are now seen at the joint clinics held between these hospitals. On May 11 and 12 this group is to hold its first general meeting, which will be open to the medical profession.[1]

On Friday, May 11, starting at 10 A.M., at the Royal College of Surgeons there will be a series of reports, mostly from the special postgraduate hospitals coöperating in the scheme, giving some account of the working of the joint-consultation clinics, of the way in which surgery or radiotherapy have been selected or combined in the treatment of special groups of patients, and of the results obtained over the past twelve years. There will also be accounts of some of the joint clinical research projects initiated within the group. An exhibition illustrating the work of the clinics will be on show in the council room. An account will also be given of the coöperating hospitals cancer registry which has been set up to provide a direct registration and statistical service to each of the coöperating hospitals. The scheme is designed to obtain complete cancer registration within this group of hospitals and for the registry to provide each individual hospital, and indeed each individual member of each staff, with any recorded information they may require about any group of patients seen, including the follow-up.

On Saturday, May 12, the Royal Marsden Hospital will be open from 10 A.M. to 1 P.M., and demonstrations of special facilities available to the group and some of the clinical investigations, treatment, and research carried out will be on view.

SOCIETY OF MEDICAL OFFICERS OF HEALTH

NEXT week this society is celebrating the centenary of its foundation. At the opening meeting on Tuesday afternoon at B.M.A. House Dr. Huntington Williams, health commissioner of Baltimore, will deliver a message from the American Public Health Association and himself receive the honorary fellowship of the society from Dr. C. F. White, the president. The following day at 2.15 P.M. open fora will be held on public-health problems of today, and at 4.30 P.M. Lord Adrian, O.M., will deliver an oration on the Organisers of Health. In connection with the celebrations, exhibitions will be held at the Wellcome Historical Medical Museum and the London School of Hygiene and Tropical Medicine. The Lord Mayor and corporation of London are giving a banquet, and the London County Council and the British Medical Association receptions, in honour of the society.

1. Copies of the programme may be had from the House Governor, Royal Marsden Hospital, Fulham Road, London, S.W.3.

THE INDEX and title-page to Vol. II, 1955, which was completed with THE LANCET of Dec. 31, is to be issued next week. A copy will be sent gratis to subscribers on receipt of a postcard addressed to the Manager of THE LANCET, 7, Adam Street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive indexes regularly as published should do so now.

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Special Articles

THE PATTERN OF GENERAL PRACTICE

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MOST doctors visiting Britain from Canada and elsewhere have kind words for British consultant and specialist practice, but usually they are not so favourably impressed by general practice, of which Collings (1950) made a detailed and critical survey. This unfavourable impression is created partly by conditions which individual practitioners could rectify, and by certain provisions of the National Health Service Act. But the pattern of general practice is largely determined by factors not easily modified by doctors or legislators—e.g., density of population, ease of communications, capital resources, and the prosperity of the community. Whereas specialist practice is basically the same the world over, general practice must adapt itself to local circumstances.

To be constructive, criticism should be directed against conditions of general practice that can be modified, and against failure to adapt to those conditions that must be accepted. To set before future general practitioners an ideal type of practice which is unattainable is unfair, and also a disservice to their patients.

Existing Patterns

A much-criticised aspect of British general practice is the limitation of scope in the treatment of organic disease, particularly that imposed by lack of hospital privileges.

In the country districts of Canada and the United States, most communities provide general practitioners with X-ray equipment, electrocardiographs, and hospitals, which in Britain and Europe would be confined to large cities. Furthermore, owing to the dispersal of the population in such large countries many general practitioners work far away from medical centres and specialist help, and they must deal with all surgical and medical emergencies. But even in the cities the ideal of the self-sufficient practice is pursued. Since specialists in North American cities usually do not confine their practice to referred cases, they are in direct competition with general practitioners, who therefore, even more than their British colleagues, feel a need for the prestige value of equipment and hospital privileges.

In Britain a much lower proportion of the country's capital resources is devoted to general practice and to hospitals than in Canada and the United States. Premises suitable for general practitioners, and even general practitioners themselves, are scarce in some areas. Because of the shortage of hospital beds the British general practitioner spends much time visiting and treating patients in their own homes: much of his visiting is in effect a vast ward round. Because of the shortage of practices these are large—there is an average of over 2000 patients per doctor (Hadfield 1953)—and in cities they tend to be very large. Shortage of hospital beds and the large size of his practice combine to fill the general practitioner's day with work outside the hospital.

Nevertheless, because Britain is densely populated, a reasonable standard of medical care is possible despite these shortages; for frequent visiting is feasible, and patients need not be admitted to hospital merely because they live too far away for supervision, as is often the case in Canada. Furthermore in Britain visiting is eased by the good roads, universally tarred or "paved." Specialists are within easy reach, and the amount of major therapy which a general practitioner is justified in undertaking is therefore greatly reduced.

The Canadian doctor, except in the largest cities, minimises the distances he travels by having his house and office within easy reach of the hospital, by commonly advising his patients by telephone, and by visiting patients in their homes only when he must. His practice is therefore limited only by the distance patients travel to see him, which may be 40 miles or more. In Britain, because home visits constitute such a large part of his work, the general practitioner must restrict his practice to a convenient area. A hospital serves an area containing many practices, of which only a few will be near to it. A doctor whose time is filled by travelling about his practice may find it difficult to fit in a long journey to see a patient in hospital. This was my experience in a semi-rural practice in Lincolnshire; a small hospital was available to some 10 general practitioners, but in fact only 4 of us, whose practices included the hospital geographically, used it to any extent.

THE HOSPITAL

It was my experience in Britain that the patients for whom I was responsible in our small general-practitioner hospital would have benefited from the care of a doctor who, if not a specialist, at least spent most of his time doing hospital work; and I had a suspicion that my patients would have been more efficiently managed in the fully equipped hospital with resident staff 16 miles away. Doctors in large practices with several partners can afford the time for regular hospital work; but the single practitioner or member of a small partnership finds that his few hospital patients cost him a disproportionate amount of time, effort, and worry. A doctor who does most of his work in hospital is not bothered by the feeling that he should be elsewhere; but the practitioner attached to a hospital is always having to consider conflicting priorities, and an emergency in hospital may coincide with one outside. Hospital work requires not only skill in certain procedures and experience in interpreting special investigations, but the establishment of harmonious personal relations with all members of the staff. A hospital is an instrument, and, as with other instruments, a certain critical frequency of use is needed to maintain proficiency. The doctor who combines hospital work with a busy general practice is continually having to make the effort to change his mental orientation to a different pattern of work. This adds to his burden and impairs his efficiency.

An objection to the reservation of hospitals for specialists is that patients lose the continuity of care and personal interest of their family doctor; but the wise patient prefers to be operated on by an experienced surgeon, even if he is a stranger. A further objection is that doctors lose sight of their most interesting cases through admission to hospital. But why do doctors think these cases so interesting? Surely because they are cases of disorders about which they were taught as students in hospital, whereas the majority of patients seen in general practice are not. The late Sir James Spence drew attention to the large number of illnesses seldom dealt with in hospital teaching (Spence et al. 1954).

This division of labour between hospital practitioners on the one hand and non-hospital practitioners on the other makes for effective use of doctors in densely populated areas. Unhappily because of our undergraduate training we find it hard to accept this situation and make the best of it. There is a risk that general practice may be forced into a form to suit our training, instead of our modifying it in the best interests of patients and the profession.

General practitioners usually attribute the small number of hospital beds available to them to arbitrary regulations or selfishness on the part of specialists, rather than to an inherent feature of British medical practice. Many doctors feel that their prestige is impaired by lack

of hospital privileges, but British patients expect to be referred to specialists for major procedures and they do not think less of their own doctor because of this. In contrast, general practitioners in small towns in Western Canada do much surgery, partly because this is often essential, and partly on the assumption that their patients expect it of them. A demand by the general practitioner for hospital work or some form of specialised practice is reasonable if this will fill a local need, but it should not be allowed to prevent him giving adequate time to the rest of his patients.

The general practitioner is taught as a student principally about diseases which are best treated in hospital, and he tends to think that hospital practice is the most important aspect of medicine. This is bad because he will be frustrated at being unable to practise the sort of medicine he was taught, and also because, in his quest for hospital privileges and impressive equipment, he may be diverted from his rôle of adviser and friend to his patients.

The overwhelming part played by the hospital and its specialist staff in our education deeply affects our ideals of medical practice. We spend so much of our early career inside one that it is difficult for us to see that a hospital in relation to present-day medicine as a whole is only a specialised instrument: certainly a very large, important, impressive, and expensive instrument, and for this last reason one which must be reserved as far as possible for patients in a phase of their illness in which it is needed. Since the hospital is the scene of so much impressive, and by and large successful, medical endeavour, the student may be forgiven for thinking that it is the whole world of medicine that matters, in which the consultants are the heroes. The consultants have not been assiduous in discouraging this view. It is not surprising, therefore, that the doctor graduates as an indifferent specialist rather than as a general practitioner, and that he retains a respect for hospital privileges, access to impressive equipment, and technical skill.

The original concentration of medical teaching in hospital was necessary to break the unscientific traditions of the apprenticeship system, which still is often perpetuated in assistantships. But general practice has become increasingly effective, recently aided by chemotherapy and by diagnostic facilities such as the Public Health Laboratory Service. The extension of medical care to the whole community has only been possible through a great increase in the effectiveness of general practice; similarly, the economical use of hospitals and the extension of medical care to the whole community are possible only because of the general practitioner's work outside hospital. If general practice is limited in scope, it is because medical education did not prepare the present generation of doctors for this type of work.

Introducing students to general practice is still in the experimental stage, and although this has been under way for some time in the United States and Scotland, English and Canadian universities seem to be approaching the problem more cautiously; the colleges of general practice in England and Canada should speed this scheme.

The general practitioner has a continuous responsibility for his patients, although for a phase of an illness they may be in the hands of a specialist. In fulfilling this responsibility he encounters organic disease he knows how to diagnose and treat rationally, disease he can diagnose but must refer for treatment (which if he conducts his practice well need not constitute more than 15% of his cases), organic disease which neither he nor anyone else can do more than palliate, many disorders of a probable organic origin which do not fit into any distinct syndrome, and 30% or so ailments largely psychogenic. This is a sufficient challenge to any man's scientific and humane abilities for which he needs as much time as he can gain. Unfortunately his training has prepared him very unevenly for these various types of case. The young general practitioner not unnaturally tends to pay most attention to the types of case he has been taught about, and is apt to think that patients who do not have syndromes he recognises are not really ill. Yet if he attempts to select those he will help and those he feels not morally entitled to help, he creates needless difficulty for himself and unhappiness and hostility in those rejected. Treatment of course does not necessarily consist in granting all demands, but may consist in a firm but polite explanation why none is necessary.

Until he has had much experience he tends to judge the quality of general practice by specialist criteria, and feels that he should be using methods appropriate to dealing with disease at the specialist level. Since he has to deal with comparatively large numbers of patients, inevitably part of his work consists in "screening" or selecting those most suitable for specialist treatment. This should cause no shame and is an important part of his function as part of the medical team. Specialists appreciate the general practitioner who uses them efficiently on behalf of his practice.

Conclusion

No rigid pattern for general practice should be devised. The general practitioner's work is decided by the needs of the society he serves, but his ability to fill this need is impaired if his training gives him too rigid a conception of medical practice; for instance, in the small towns of Western Canada he is required to do much emergency surgery which in Britain he is not. General practice fills the very big gap between the medical needs of the community and the capacity of hospitals and specialists to meet them.

More doctors should be encouraged to become general practitioners; and practices should be made smaller. They could then spend a greater amount of time in consultations (at present brief by Canadian standards) as friend and adviser to their patients.

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THE EFFECTS OF SEPARATION FROM THE MOTHER IN EARLY LIFE

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LARGELY through the work of Dr. John Bowlby, there has been much discussion in recent years about how children's personalities may be affected by stays in institutions or in hospital during early life. For the present study we chose, from among 141 backward children, the 25 who had been separated from their mothers for at least ten weeks during their first four years of life. Actually the average length of their separation was over eighteen weeks in the first year, nearly seventeen in the second, and for the whole of the first four years no less than seventy-two weeks, or about one-third of their lives up to that point.

Assessments of their emotional development were provided by their teachers on the comprehensive Bristol Social Adjustment Guide, and comparable information as to their domestic behaviour was obtained from interviews with the mothers or with the staff of institutions. Since emotional factors are very important for the understanding of backwardness, indications of the mutual affection between mother and child had been

noted wherever possible. The study was therefore likely to reveal, among other maladjustment, any examples of the "affectionless character" which is said to result from early separation.

Four Groups

The Well-adjusted

Of the 25 children, 8 were normal and generally well adjusted in their school life, while at home they were (if one can put it that way) better than normal. They were very affectionate and thoughtful towards their mothers, so much so that they helped in the home without being asked. 3 were eminently stable, but they had not been separated from their mothers until they were 3–4 years old, and for less than a year. All these 8 children had mothers who cared for them, although the mother of one of the girls was rather a cold type of woman who had never kissed or cuddled her children.

One is bound to ask—when one has had experience of completely secure and stable children—whether this helpfulness in the home was as desirable as it sounds. Of a girl of 15 her mother said typically, "she wants to do more but I won't let her do it." It would seem that these 8 children, although well adjusted and in school indistinguishable from ordinary children, were rather unnaturally anxious to keep in their mothers' good books. They had to make themselves useful in order to make doubly sure of having a mother.

The Unforthcoming

The next group (again of 8) came in the category of unforthcoming children. At school they were of the well-known type of "timid, mousy" backward child, and this trait was really the key to their backwardness, for they lacked the confidence to face the uncertainties of learning. These 8—except the one who was still in a children's home—were even more anxious to help their mothers than were the first group.

It was quite evident that these children's efforts to please their mothers had reached the stage of anxiety. What is more difficult to decide is whether this was due primarily to their separation from their mothers in early life or to their early illnesses and other hardships. Among the sample of 141 backward children there were also 28 who had had severe illnesses in their early years *without* going into hospital or being otherwise separated. 15 of them had the same sort of unforthcoming characters as the separated children and 8 more were maladjusted or unsettled. That is to say, the non-separated children happened as a group to be about as maladjusted and somewhat more unforthcoming than the separated ones; but in a small sample such differences would be hardly significant.

The large overlap between children who had early illness and those who had been separated from their mothers makes it impossible to do more than sense which of these experiences is primarily responsible for the emotional maldevelopment. In the whole group of 141 "backwards," 51 were assessed as unforthcoming characters. Of these 20 were separated, for one reason or another, for at least one week in their first two years. In the same period of their lives 33 had at least one serious illness or its equivalent (born weakly or ill, needing medical attention owing to failure to gain weight in first months, gross physical neglect, convulsions or a fairly serious accident, burn or scald). In 16 of the "unforthcomings" there was neither separation nor serious illness under 2 years; but in these some of the above factors occurred after that age, and in others there was a history of changes of mother-figure, divided maternal attachment, or other anxiety-producing family situation. (The quantitative data on which this paper is based are summarised in the table.) In weighing the relative influence of early separation and early illness it is relevant that of the above 51 "unforthcomings" only 2 were separated without being ill, while 15 were ill without being separated. This suggests that the early illnesses more than the separations were responsible for the later unforthcomingness and anxious over-attachment to the mother. People are normally lacking in "go" after being ill; with these children the severe early illnesses may have robbed them of assertiveness and made them mother-dependent over most of their childhood.

To return to the group of unforthcoming "separated" children under consideration, one noticed in 2 of them that, while being very helpful, they were not demonstratively affectionate to their mothers.

A girl of 12, who was in hospital for four months from 1 month old, was described as "never a cuddlesome baby at all." "She has always been a child to creep into a corner on her own." In her case the mother had three children in close succession, and this child was the middle one, with a sister eleven months older and a brother ten months younger. The mother admitted that with three babies so much of age, "You can't give individual attention." Thus the child, who was discharged from hospital still poorly and covered with sores, probably did not get the subsequent mothering that a sick child needs.

With a boy of 13 there were more serious indications of affectual inhibition. As a toddler he had been some eighteen months in hospital and convalescent home, where he forgot his mother and became attached to a nurse. Afterwards he would not take to his mother, went down the garden as far as he could go to play on his own, became a wanderer, and got a bad reputation in the neighbourhood for destructiveness and pilfering. But his mother had given birth to another child the very day he returned from his long stay in hospital, so that the homecoming must have been inauspicious. Also she had the unfortunate habit of using threats to put him away when he was naughty; and for two years he had been waiting to go to a residential school. It would thus seem that there was enough insecurity about his situation, as it was then, to account for his unsettledness at home, although his early separation is likely to have made him more sensitive to his mother's threats and to the prospect of being separated from her again.

The Unsettled

The next group, of 5 children, were unsettled both in school and in their homes—i.e., they showed definite signs of maladjustment, though not enough to justify classifying

SUMMARY OF QUANTITATIVE DATA

Total sample of backward children of ages 8–15 years	141

Social Adjustment * (contemporary)

Maladjusted	34 (24%)
Unsettled (lightly maladjusted, very restless, &c.)	20 (14%)
Unforthcoming	51 (36%)
Specific tension with otherwise fairly good adjustment	5 (3½%)
Stable	31 (22%)
	141

* Assessment of adjustment made on the Social Adjustment Guide (Day-School edition).

Early History of 51 "Unforthcomings" (0–2 years)

Separated from mother at least one week	20
Serious illness or equivalent	33
Neither of above	16
Separated without being ill	2
Ill without being separated	15

Social Adjustment and Long Separation

Separated from mother at least ten weeks in first four years (mostly in hospital)		Seriously ill in first two years, but not separated from mother	
Stable	8 (0)	Stable	5
Unforthcoming	8 (0)	Unforthcoming	15
Unsettled	5 (1)	Unsettled	3
Maladjusted	4 (3)	Maladjusted	5
Total separated	25	Total ill but not separated	28

The figures in parentheses give the numbers separated under 4 years of age, but without being seriously ill so far as is known except for physical neglect. 9 children were separated a month or more under the age of 4 without serious illness. Of these 4 were unforthcoming and 5 were maladjusted.

them as maladjusted children. It is significant that all these again were unnaturally helpful towards their mothers. There were also powerful additional factors, other than early illness or separation, which could account for their unsettledness. One of these children was the twin of a girl in the well-adjusted group. His unsettledness is of theoretical interest in that besides being badly scalded as an infant he suffered distressing experiences during the nine months' separation, while his stable girl-twin did not. During his stay in a residential nursery, he was removed to hospital because of ringworm, and underwent what to a toddler must have been the terrifying ordeal of having his head shaved without his mother or other familiar person being there to comfort him.

Another of this unsettled group well illustrates how the lack of a mother in the first years of life, while not making the child into a completely "affectionless character," may provide it with a mechanism by which it can cut itself off from affection. This withdrawal will not be the dominant element in the personality unless the child feels itself unwanted and unloved in its contemporary life; but it reverts to a defensive attitude of "affectionlessness" when punished or is otherwise in disfavour.

The boy in question was placed in an institution when 3 weeks old, and remained there until he was 3. The mother could not bear to visit him during most of this time, but accepted him gladly when, on her marriage, she had him to live with her. When, preparatory to his homecoming, she visited him, he was "petrified of anybody and stayed in the middle of the room and screamed." At home "he was not a cuddly child; you couldn't pick him up on your knee, he didn't want it." Her constancy, however, won him over, and the only complaint she made of his home behaviour was that he had terrific tempers and got stubborn "for really nothing at all." This underpattern of withdrawal shows itself occasionally in children who have had to do without a mother in their early years; when they are crossed they go into a stubborn "freeze."

The Maladjusted

So far 21 of the 25 children are accounted for, which leaves only 4 really maladjusted ones. One of these was a foundling child who had been in institutions all her ten years of life. Little can be said of her except that she represented that mixture of hostility and anxiety for acceptance which is found as a type of maladjustment just as much outside as inside institutions.

The second girl was put in an institution when she was $3\frac{1}{2}$ for some two years: her mother was an invalid who later died. After that she was passed back and forth among various relatives, with the result that she became virtually unmanageable, and could not be kept in a residential school, in a mental defectives' institution, or with a foster-mother—until finally an aunt by marriage took pity on her and heroically showed herself determined to keep her. This child, after a year of this latter-day security, was very friendly and attention-seeking, but would become stormily defiant at the slightest provocation, and stole frequently as the pronouncedly anxious-hostile type are inclined to do.

The third child was away from her parents, either in hospital or evacuated, until she was nearly 6. Her main preoccupation was expressed in her repeated question to her mother "If I am not a good girl will I have to go away?" This child was also of the defiant hostile-anxious type.

The common element in these three girls' lives was that they had no permanent mother-figure during their childhood, but had to make do with such affection as was offered by whoever was in charge of them for the time being. Even then they were not affectionless: they had a burning need for affection, alongside the rejection and hostility which they always kept ready at hand in case their need for love was not met. Their maladjustment was the imprint upon them, not of any specific phase in their lives, but of their motherless state over large stretches of it.

The last child comes nearest to the type of the "affectionless character." He had trained himself never to seek sympathy, and, so he never cried when he hurt himself. His mother often threatened to have him put away, especially over his stealing, in which he indulged shrewdly both at home and at school, but he showed no distress at the threat. He was one of those children who, although reputedly of dull intelligence, could "tell lie after lie and look you full in the face." How is such a character made? His early history did not differ greatly from that of the other maladjusted and unsettled children. Being exceedingly puny and underweight at birth he was retained in hospital for the first three months of his life. When, at that age, he was returned to his mother she put him in a day nursery because she was in residential service. At 1 year he had another three months in hospital with meningitis. When he was 6 or 7 his mother, as she said, "tried to get him away but we could not do anything about it. He was a drawback to me working in service." All this was related in front of the child in a matter-of-fact way. It was evident that the child must have heard all the details of the steps she was taking to get rid of him. Thus was progressively destroyed his faith in her loyalty as a mother. It was this unnatural situation during the years between 6 and 9, rather than his early experience, that was making him seek refuge in affectionlessness. But he helped his mother with the washing up, swept for her, and "starts to clear the table even before you have finished"—which shows that the term "affectionless character" in this as probably in most cases is an over-simplification, about which caution must be exercised in the diagnosis of maladjustment.

Separation and Security

What conclusions can be drawn as to the effects upon these 25 children of long early separation from their mothers? The only definite one is negative: in itself the separation certainly does not have the dire consequences that have been supposed; for, if it did, there would have been more than 4 maladjusted children among the 25 considered. Furthermore their maladjustment, and the unsettledness of 5 of the other children, can be accounted for by a succession of other factors in their later lives. The formula for maladjustment is to deny the child family security. More exactly, this means that for stability of character a child needs to feel that it has reliable—that is to say permanent—human attachments. It is not affection in the sense of fondling or treats or indulgence that counts, but affection in the sense of a loyalty which induces the parent or other adult to stick to the child through thick and thin and neither relinquish the child to other care nor threaten or appear likely to do so. A child who has never enjoyed these loyalties from any adult at any time will become the so-called "affectionless character"—the toughened rogue without loyalty or sense of decency. But such children are exceedingly rare, and, certainly at the pre-adolescent stage, the loss of feeling will still be incomplete and there will be at least a modicum of anxiety for acceptance.

There is nevertheless some evidence that long separation can have a detrimental effect upon a child's emotional development. In the total sample of 141 there were 9 children who had been separated a month or more under 4 years of age without, so far as was known, any serious illness or its equivalent. Of these 5 were maladjusted (3 of them being mentioned above in the group of 25 separated ten weeks or more), and 4 were unforthcoming. The quantitative evidence as to the effects of separation as such is thus scanty, but the indications

are that it acts as a predisposing factor to anxiety. Without other adverse factors the child may become oversensitive to the loss of its mother and its family—that is to say, develop into an over-good, over-helpful, over-loving, anxious child. If other adverse factors are present the early separation seems to contribute to the maladjustment, or to reinforce the unforthcomingness resulting from severe early illness. The effect of a spell in hospital or in an institution, provided it is not unduly long, seems to depend largely upon attendant circumstances—notably traumatic events such as painful or terrifying experiences, pre-existing anxiety about loss of the mother, or inadequate mothering in the immediate post-hospital period. In short the context of the separation in the child's emotional development is more important than the bald fact of separation in itself.

The effect of *long* separation seems to be no more and no less than that of a period in the child's life when it is deprived of family security. There is nothing special about it which takes it out of our formula, except that the earlier a bad experience the greater impression it would presumably make upon the child. It was seen, with the first group of stable children, that even a long period of separation in early life may have few upsetting effects if the mother has given good affection and has been loyal to the child during the remainder of its life. With the unsettled group the separation appeared to be partly responsible—perhaps as a starting-point of insecurity because circumstances were unfortunate, perhaps as a contributor along with other unfavourable factors. In these cases there was evidence of the child having suffered from the early separation. It was on the other hand noticeable that serious unsettledness or maladjustment pointed to something being wrong in the child's contemporary life. We may conclude that early unfavourable experiences may make a child temperamentally sensitive, insecure, and lacking in confidence, and possibly even leave it with a capacity for effectional inhibition; but it is what has been happening to a child in more recent years that makes it maladjusted.

There is consequently no need for undue alarm and anxiety about separating children from their parents when this is necessary. At the same time the potential harmful effects should be recognised and minimised.

Preventive Measures

In such preventive work it may be useful to consider three categories of children.

Short Separation

In the first are those who will normally return within a few weeks or months to their own homes. These include children in residential care for a special reason, such as an illness or nervous breakdown of the mother. Children who go into hospital for a relatively long time will also be in this category. With the latter the ideal solution is that the mother should go into hospital with the child; and though this is usually difficult for domestic reasons, it should be arranged, whenever practicable, when the treatment is likely to be painful or frightening. With children temporarily in public care this solution is nearly always ruled out, because the mother's unavailability is the reason for their being there. With ordinary hospital cases, if the mother can visit every afternoon or at any rate three to four times a week, this should largely overcome any bad effects. Alternatively, if the mother cannot visit, the other members of the family should do so as frequently as possible.

Another measure indicated by the cases quoted is that we should attend to the manner in which the separated child is reunited to its family. If it has been away a long time and has been kindly looked after it will naturally have taken to some extent to the staff of the hospital or institution, and its mother will be a bit of a stranger. This, then is the period of maximum sensitivity, when harm can be done if the child does not receive a warm and unpreoccupied welcome from the mother. It is not good enough to notify a mother that her child is ready for her to collect on a certain day: we should ascertain that she is available, in good health, and emotionally prepared to welcome it. It is also our duty to help mothers understand the emotional readjustment which a child has to make upon its return home, and to see that she is not disappointed if the child does not take to her immediately.

Long Separation: Contact Retained

The second category consists of those children who are more or less permanently in an institution but remain in touch with their families. A child is probably affected more fundamentally by his feelings about his family than he is by his day-to-day life in the institution. We should therefore regard the guidance of child-family relations as an important point of our work. This means doing our best to ensure that the parent or other relative visits frequently, does not fail to turn up or lightly postpone visits, and brings in whatever little luxuries can be afforded. If the parents are at a distance we should try to prevail upon them to write frequently. Incidentally many children are known to have relatives, but these never think of contacting the child, or do so once in a while; in many cases we ought to persuade them to become active "aunties" and "uncles." Any reputable relative is of tremendous value to a child in giving it a sense of having a family.

One of the difficulties is that mothers or relatives left with orphaned children want to keep the girl but not her brother. If the latter only is placed in an institution he is very likely indeed to resent it bitterly and become the hostile-anxious sort of maladjusted child. Perhaps we should insist where possible upon both or neither of the children being taken into care.

Contact Lost

With the third category—those children out of touch with their relatives—we have to provide the nearest thing we can to a feeling of belonging to a family. I do not think this so hopeless as it may sound, but it will probably entail big changes in the organisation of some homes. We need not necessarily try to imitate the special type of self-contained, small, European family. The traditional Indian household and the African family are larger units. But all families, even though numerous, have their own structure of human relationships: each individual has his special place according to sex and seniority, and there are other members who are specially near him or her. A home of some 20 boys or girls, more or less of the same age, with house parents and one or two assistants, is not structured in this sense and so none of the children can feel that they are the special concern of any of the senior members of the group. The family-group basis into which some homes have been so successfully broken up is going a long way in the right direction. To carry the idea to its logical conclusion, the family group should be a mixture of ages and sexes, so that boys and girls from babyhood to leaving age would be in the same "family." This would enable us to dispense with the nursery institutions; and the presence of a baby in the group has been found to have a settling effect upon the older boys and girls. To follow this idea of the structured, diverse, group further, we should so far as possible avoid communal eating, daily assemblies, or daily outings *en troupe*. This of course would not bar the occasional corporate gathering or excursion, which might be compared to the tribal assembly which gives a sense of being part of a powerful parent-body. That, by the way, is one of the things that a voluntary home can offer which a local authorities' home cannot.

A further difficulty we have to face is that of staff leaving; and the more family-like we make a group

the greater will be the blow if the family loses its "mother." To a group of normal or stabilised children such a change can probably be overcome without harm, but for a maladjusted child, to take away the woman in whom it has learnt to trust may be absolutely disastrous. Such children should be placed in family groups which are likely to have a permanent mother-figure.

Assessment

The precise assessment of the influence of the events of early life upon emotional development obviously depends upon our having the means of diagnosing the nature and degree of maladjustment. In the past we have had perforce to rely upon subjective clinical assessments. These, however, are unreliable because they are weighted first by the interpretative preferences of the individual clinician and secondly by the fashion of the times. For example, psychopathic personalities and affectionless characters are at present being over-diagnosed. An alternative, and more objective, means of assessment has proved successful in the Bristol studies. This asks the observer to furnish only data as to the child's behaviour and attitudes, the interpretation of the latter being limited to a recognition of elementary emotional expression. It has been found that the behavioural data thus provided fall into fairly clear syndromes, indicating the existence of a small number of general maladjusted attitudes which serve as a basis for the diagnosis of maladjustment.

Summary

This has been a study, based on the case-histories of backward children, of the effects of early adverse factors upon personality-development, with special reference to separation from the mother.

The mere fact of separation had a markedly small specific effect, but it contributed to unsettledness or unforthcomingness when other adverse factors were present. With short separation, the attendant circumstances of the separation and the maternal care received on return home were seen to be more important than the separation in itself.

The preventive indications are that, where a child has to undergo painful or frightening treatment, the mother should enter hospital with the child; for other hospital treatment frequent visits should suffice, together with guidance to the mother about the homecoming.

The minority of maladjusted children in the group of "separateds" owed their condition in the main to lack of a permanent parent-figure throughout large parts of their lives, including their contemporary situation. Separation could predispose to "affectionless character," but this is due to a lack of maternal loyalty throughout life.

The most striking positive finding from the point of view of personality-development was the high proportion of early illness among the unforthcoming children. This was a general state of anxiety seen as chronic lack of confidence and over-attachment to the mother. To this separation was only a minor contributory factor.

The Wider World

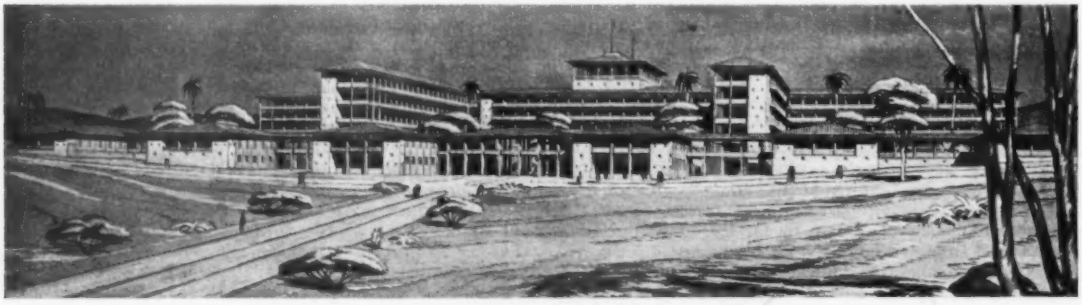
IBADAN

The New University College Hospital

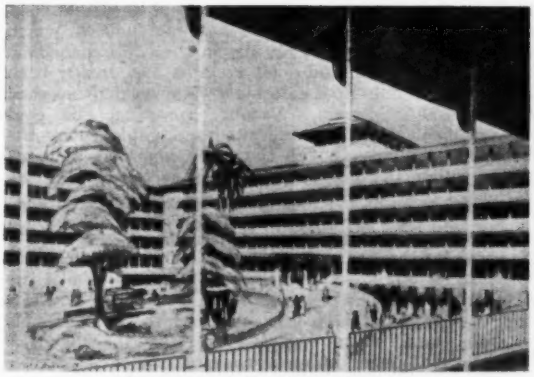
Ibadan, visited by the Queen and the Duke of Edinburgh towards the end of their tour of Nigeria, is one of the most remarkable cities in Africa. Capital of the Western Province, with a population of more than half a million, it is the fourth or fifth largest city in the whole continent. But it is not so much for its size that Ibadan is likely to play an increasingly important part in the world as for its development in the past decade as a university town and a centre of African learning.

Since the late war, Nigeria has made notable progress alike in the political, the economic, and the educational fields. Politically, Nigeria is now a Federation with three component regions and the Trust Territory of the Cameroons. Both in the regions and at the centre political power is very largely in the hands of Nigerian ministers. Mainly because of favourable prices for produce the post-war period has been one of relative prosperity with expanding public revenues and much development both in the public and private sectors. But here, as elsewhere, civilisation and modern methods of communication have outstripped the available technical resources, with the result that the recruitment of trained professional people—always a difficult problem—presses with increasing urgency as the country advances. In particular Nigeria has a great need for doctors, of whom there are only 509 in the whole country, and it was the recognition by the Elliot and Asquith Commissions, whose reports were published in 1945, that the only solution of the problem lay in training Nigerians for positions of responsibility in Nigeria itself, which led to the founding at Ibadan in 1947 of a University College with faculties in arts, science, agriculture, and medicine.

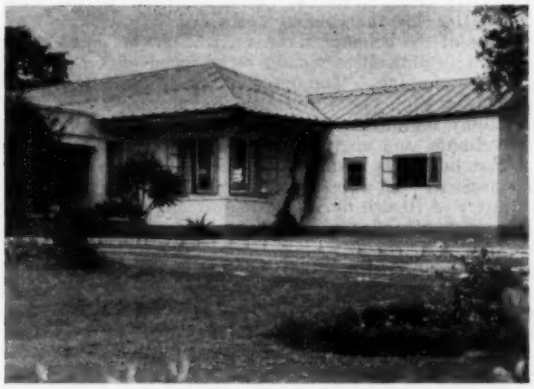
Housed temporarily at first, the University College now has a fine new site just north of Ibadan with striking modern buildings erected at a cost of over £2½ million. But though the other faculties were soon well established, that of medicine had many difficulties to face. From its inception the University College was in special relationship with the University of London, which means that, with modifications to meet particular Nigerian requirements, the students are prepared for London degrees—an essential, in the initial stages, for recognition by the General Medical Council and the acceptance of training at Ibadan as the equal of that elsewhere. This arrangement, however, valuable though it is, brought immediate troubles to the young medical school, for the standards of London are high; and, though the facilities for preclinical training were soon recognised as adequate,



View of the hospital as it is to be.



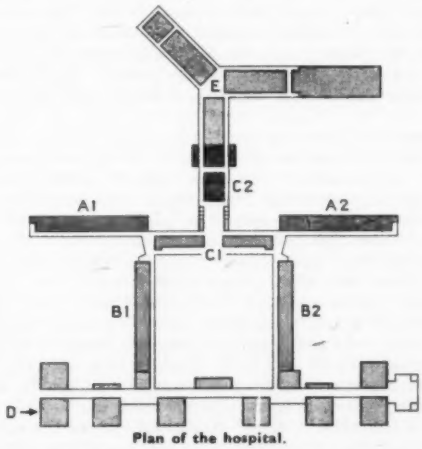
The courtyard of the future hospital.



Part of one of the staff houses.

those for clinical training in the two existing hospitals of Ibadan were not of the requisite level. Accordingly the government of Nigeria decided in 1951 to press forward with plans for the building of a separate teaching hospital, associated with but administered independently of the University College. Meanwhile the University of London, as an interim measure, agreed to make room for Nigerian students for clinical study in British medical schools until it should be completed.

In Nigeria, of course, there are fewer difficulties about space than would have to be faced in planning a great new teaching hospital in this country; and the board of management, in acquiring a site not far from that of the University College, were able to plan with reasonable



Plan of the hospital.

freedom. When the hospital is finished, it may well be the envy of clinical teachers in some of our own medical schools.

Building began in 1952 and progress has been such that at the time of the visit of the Queen on Feb. 14, the hospital was assuming something like its final shape. Its occupation is expected to begin this year and clinical teaching in October, 1957. Besides the teaching of students, the hospital is also to provide research facilities for the medical faculty; a school for the training of nurses up to the standard prescribed by the General Nursing Council has already been established and the first group of students has qualified.

No expense is being spared to make the hospital, both in standards and equipment, fully comparable with teaching hospitals in the United Kingdom. Grouped around the main building—each a notable example of modern design—are the ancillary departments. These include the medical school and hostel for clinical students, a school of nursing, a nurses' home, a school of hygiene, a resident medical officers' hostel, sisters' quarters, and housing for medical, administrative, and technical staff.

As shown in the plan which we reproduce, the hospital itself consists of eight blocks. Blocks A1 and A2 have five floors, while blocks B1, B2, and C1 have six floors, including a lower ground floor. Block C2 has eight floors, including a lower ground floor, whilst blocks D and E consist of ground floor and lower ground floor only.

On the ground floor, the board room and administrative offices are housed in blocks C1 and A2, the casualty department in B2, an X-ray department in C2, and laboratories in A1 and B1.

The wards for inpatients are on the upper floors of blocks A1, A2, B1, and B2, and the professorial units on the upper floors of C1, while the air-conditioned operating-theatres, the cardiographic department, and the central sterilising department are in C2. A hall with provision for eight lifts is also included in these latter blocks.

A spacious outpatient department is located on the ground floor of block D. This floor also contains the pharmacy, almoners' offices, and patients' record department: a physiotherapy department and an antenatal clinic are on the lower ground floor. Block E houses the kitchens, laundry, boiler-house, and staff dining-rooms.

When complete, the hospital will have 490 beds. Of these, 116 will be medical (including 28 for dermatological and neurological cases); 144 surgical and orthopædic (including 28 for septic surgical cases and 28 for ear, nose, and throat and ophthalmic patients); 109 obstetric and gynæcological; 68 pædiatric; and 28 for tuberculosis and thoracic surgical cases. There will also be 23 cots for sick babies and 2 observation (metabolic) beds; in addition 14 recovery beds adjoining the operating-theatres and 6 labour beds are envisaged.

The new hospital, besides providing for the training of students, will more than double the number of beds available for inpatient treatment in Ibadan. But University College Hospital will, it is hoped, do more than serve the local needs; as the centre of the country's medical life, it will provide a consultant service for the treatment of difficult cases throughout Nigeria, stimulate research, and play a vitalising part in the hospital services as a whole.

Naturally the cost of this great undertaking has been high, and according to current estimates a total capital outlay of £4½ million will ultimately be required. But it is a remarkable tribute to the determination and foresight with which the federal government are facing their responsibilities that the whole of this sum is being provided exclusively from Nigerian resources. At the moment the number of students entering the medical school is small, numbering only 30–40 a year. The new hospital is a sound investment in that it will both

stimulate entry into the profession and lay a firm foundation for the country's medical future.

Most of the benefits, however, will not be immediate, and many difficulties remain to be faced—not the least of them staffing. Though the first Nigerian medical graduates from the University are now returning and will play an increasing part, the medical faculty, the consultants, and many of the residents and nurses must at first be drawn mainly from Britain—an arrangement facilitated by an agreement recently concluded with the Ministry of Health by which doctors, nurses, and technicians may accept engagements at Ibadan for periods not exceeding six years without losing their position under the National Health Service superannuation scheme.

The hospital board of management has repeatedly expressed its lively appreciation of the practical help and interest of the University of London and other British universities and of the valuable contacts which have been established with individual medical schools and teaching hospitals. The outstanding need is to secure a medical staff, consultant and non-consultant, of the right size, composition, and quality. The opportunities which Ibadan offers for an interesting and rewarding medical career are manifold, and good progress has already been made in building up a suitable staff of resident medical officers and registrars. Broadly speaking, the consultant medical staff are recruited and employed by the University College, though they hold honorary appointments under the hospital. Important and interesting vacancies exist, or are impending, in this group.

* * *

It is not the least of the results of the Royal visit to Nigeria that there is in Britain an increased consciousness, not only of our unity with her peoples, but also of the extraordinary progress which they are making towards their development as a self-governing nation. To this progress the new University College Hospital will make an important contribution in the years to come.

Public Health

BACTERIAL RODENTICIDES AND INFECTION WITH *SALMONELLA ENTERITIDIS*

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EVIDENCE is presented here that the jena and danysz varieties of *Salmonella enteritidis* are pathogenic to man and animals, and that disease in man and animals is sometimes caused by rodenticides consisting of living cultures of one or both of these organisms.

Table I shows that both the jena and danysz varieties of *S. enteritidis* cause sporadic cases and outbreaks of food-poisoning, including some fatal cases in this country. These findings support similar evidence from other European countries and from the U.S.A. The use of *S. enteritidis* for destroying rodents is unjustified because man has been accidentally infected in the past and may be so again. An outbreak in Stoke-on-Trent, due to the jena variety, caused 6 deaths in about 30 people affected. 'Liverpool Virus' was suspected of being the source of infection, but complete proof was lacking.

An outbreak in 1944, described by Dathan et al. (1947), showed conclusively that infection of 4 children was due to the use of a "virus" preparation. In this outbreak a child was seen handling an empty bottle of the "virus" preparation. *S. enteritidis* var. *jena* was isolated from this bottle, from the child, and from 3 other children in the household.

A large outbreak due to the danysz variety reported privately by Avent showed conclusively that human illness was caused by infection with this organism. In an outbreak associated with vanilla slices only 2 persons were known to have had symptoms, and *S. enteritidis* var. *danysz* was isolated from the mice in the bakery concerned. The bakery had been baited with *S. enteritidis* var. *danysz* to clear it of vermin a month earlier (Ministry of Health 1955).

Scott (1933) described an outbreak, affecting 38 people and causing 1 death, in which food was probably infected by mice. A "virus" preparation containing *S. enteritidis* had been used in the establishment, and this organism was isolated from apparently healthy mice on the premises. These mice were probably infected by the "virus" and became healthy carriers.

So far the emphasis has been placed on infection in this country, but there are many reports of outbreaks and deaths in other countries. Leslie (1942) reviewed the published cases of human infection, due to the use of "virus" preparations, in Denmark, Germany, the U.S.A., and other countries.

The use of bacterial rodenticides raises many problems. The rodents, as a result of eating bait, develop gastro-enteritis and, if it is fatal, die of septicæmia (Bahr 1947). During this illness the organisms are excreted in the fæces, which may infect food. As in all salmonella infections, some of the rodents become infected and remain healthy or recover from the infection: Branham and Robey (1929) showed that mice infected with *S. enteritidis* may excrete the organism in the fæces for up to 21 days; Welch et al. (1941) have shown that experimentally infected rats may excrete the organism in fæces for up to 148 days; and Price-Jones (1927) showed that *S. enteritidis* could be isolated from the organs of such apparently healthy animals, which initiated an outbreak when mixed with non-infected stock. It is obvious that these apparently healthy rodents may also infect food.

During the acute septicæmia in rodents fleas feeding on them become infected (Eskey et al. 1951) and may be a factor in spreading infection among other rodents. Possibly fleas from the dead rodent may even bite and infect man, as in the spread of plague, but there is no evidence that this has ever happened.

The bait used with these "virus" preparations is laid where there are runs; these may be where cockroaches abound. Mackerras and Mackerras (1948) have shown that, in a hospital ward where there was an outbreak of salmonella infection, the cockroaches became infected. Mackerras and Pope (1948) have shown that infected cockroaches may continue to excrete salmonella in the fæces for 14 days or more. Cockroaches may also become infected from the "virus" baits and spread the salmonella. This danger may be very real, as in the outbreak affecting 123 people, described by Spray (1926), who concluded that organisms were probably transferred by flies or ants from the rat "virus" to milk and cream. This outbreak was due to *S. enteritidis*, and tests seem to indicate that the organism was the danysz variety.

Another way in which human infection has arisen was described by Lütje (cited by Hohn and Herrmann 1935) in an outbreak affecting 126 people. The infection was traced to a pig infected with 'Ratinbazillen' which became ill, was slaughtered, and was passed as suitable for human consumption. Table II shows that various animals may be infected with *S. enteritidis* of either the jena or danysz varieties and so increase the chance of both human and animal infection.

Kristensen (1946) surveyed *S. enteritidis* var. *danysz* infection in Denmark from 1926 to 1945 inclusive. During

TABLE I—SPORADIC CASES AND OUTBREAKS OF *S. enteritidis* INFECTION IN MAN IN THIS COUNTRY

Jena						Year	Danysz					
No. affected	Fatal cases	Sporadic	History unknown	Outbreaks			No. affected	Fatal cases	Sporadic	History unknown	Outbreaks	
				No.	Cases						No.	Cases
56	1	31	14	2	11	1944	4	..	2	2	..	..
184	7	17	22	3	145	1945	1	..	1	..	..	..
28	1	22	6	..	..	1946	..	..	..	..	..	..
38	1	20	10	1	8	1947	5	..	3	2	..	..
29	..	22	7	..	..	1948	3	..	3	..	..	..
109	1	29	6	2	74	1949	3	1	2	..	..	..
289	3	66	6	3	217	1950	7	..	2	..	1	5
134	2	50	25	4	59	1951	351	..	4	1	1	346
141	3	67	60	2	14	1952	4	..	3	1	..	..
170	1	74	37	5	59	1953	21	..	9	4	1	8
58	..	30	28	1	7	1954	8	..	5	3	..	..
31	1	22	9	..	..	1955 to June	6	1	6	..	..	..

this period this variety was isolated from 80 patients and 2 healthy persons. 2 of the patients had meningitis, from which they died, and 78 had acute gastro-enteritis. Kristensen states that 17 of the patients had either eaten or been in contact with 'Ratin' shortly before the onset of symptoms; in 31 of 38 cases ratin had previously been laid out in places frequented by the patients. He also found that ratin bread stored for 88 months still yielded *S. enteritidis* var. *danysz*.

Many human infections due to *S. enteritidis* occur in this country each year; it can be seen in reports on food-poisoning that this species has been the second commonest cause of salmonella food-poisoning in each of the years 1951, 1952, and 1953 (Ministry of Health 1954, 1955). *S. enteritidis* can be subdivided by biochemical reactions into four varieties, of which *S. enteritidis* var. *jena* is the most common and *S. enteritidis* var. *danysz* the second commonest in this country.

Table I has been compiled from information received with cultures which have been identified in this laboratory. It shows that both the jena and the danysz varieties may cause sporadic infections or outbreaks. Some infections were fatal, but, as with salmonella infections due to other species, some of the deaths were in patients with another disease in which the superadded *S. enteritidis* infection merely accelerated the fatal issue. Of 21 deaths due to *S. enteritidis* var. *jena* 7 were associated with one of the following diseases: leukæmia, fractured femur, severe hypertension, early carcinoma of stomach, cardiac failure, pneumonia, and severe mental illness. In the remaining 14 cases death was directly attributable to infection with *S. enteritidis* var. *jena*. The danysz variety gave rise to a fatal meningitis in a patient with anæmia. In another case, recorded in 1955, infection with the danysz variety caused the death of an otherwise healthy man aged 57. The clinical symptoms due to the two varieties were much the same. In 1954 the history of 16 cases of the jena type showed that the duration of the illness was 2–28 days (average 10); in 4 patients with danysz infection the illness lasted 5–10 days (average 7). The symptoms in both infections were those usually associated with food-poisoning: pyrexia, diarrhœa, vomiting, occasionally blood and mucus in the stools, and some abdominal discomfort or pain. Although the clinical symptoms were not usually severe, in some instances there was cause for alarm. A patient with jena infection was suspected of having infective endocarditis due to this organism; a patient with danysz infection had rigors, and another collapsed. Though these serious symptoms are unusual they may occur, and individual patients may show any degree of severity, even to a fatal outcome, both in jena and in danysz infections.

Outbreaks

Table I shows the number of outbreaks from which information and cultures were received. Both the jena and the danysz varieties can cause large outbreaks. In this survey an outbreak has been defined as affecting 5 or more persons and therefore has not included some smaller outbreaks. Descriptions of some outbreaks are given below from reports received here and from other sources.

Outbreak due to S. enteritidis *var.* danysz

This report was made by Dr. M. Avent, medical officer of health for Basingstoke, and is published with his kind permission:

REPORT ON OUTBREAK OF FOOD-POISONING CONNECTED WITH BASINGSTOKE SCHOOL MEALS DEPOT

On Friday afternoon, June 8, 1951, a message was received that children at Silchester, Monk Sherborne, and Ramsdell schools had been taken ill with diarrhœa and vomiting.

Inquiries suggested that the illness was connected with the midday meal at school on the previous day, June 7. Reports were later received of similar illness among children at Herriard, Steventon, and in the Kingsclere and Whitchurch Rural District (Hannington, Overton) and the Alton Rural District (Wield, Medstead).

Specimens from patients were examined in the Public Health Laboratories at Reading and Winchester, both of which reported the presence of *S. enteritidis*, an organism commonly associated with outbreaks of this type.

Head teachers in the schools give the following figures:

(*a*) Schools supplied by Cooking Depot	25
(*b*) Schools reporting cases of illness	12
(*c*) Children at (*b*) taking meal	929
(*d*) Children affected with illness	346

The staff at the depot ate the same meal, and about half were taken ill, 4 of them so seriously that they were off duty for several days, and 3 are still away (June 20). Examination of specimens from all 4 of them showed salmonella present in 2 and they have been excluded from work at the depot till clear.

Unfortunately the only material used in the preparation of the meal in question which could be obtained was some custard and a few bread crumbs, examination of which gave negative results. It was impossible to obtain any of the meat which had been used in the "savoury mince" supplied that day, because it had all been disposed of.

TABLE II—*S. enteritidis* INFECTIONS IN ANIMALS 1944–54

Source	Jena isolations	Danysz isolations
Sheep	1	..
Duck	2	..
Guineapigs	65	4
Cow or calf	2	2
Pony	1	..
Mice	43	4
Dog	1	..
Duck eggs	2	..
Hamster	2	..
Chick	1	..
Porcupine	1	..
Pig glands	8	1
Rats	3	85
Horse	1	..
Rabbit	..	1

TABLE III—RODENT VIRUS INVESTIGATIONS

Year	Preparation (bottles)	Organism	Single colony	Organism
1944	Liverpool Virus (mice)	Jena	..	..
,,	,, ,, (rats and mice)	Danysz	..	..
1945	Liverpool Virus (blue label)	Danysz	..	..
,,	,, ,, (yellow label)	Danysz	..	..
,,	,, ,, (green and yellow label)	Danysz	..	..
1947	..	..	Ratsouris	Jena
1948	Ratsouris	20 % Jena, 80 % Danysz	Bait (Ratsouris)	Jena
			Bait (unknown)	Danysz
			Bait (probably Ratin)	Danysz
			Bait (Ratsouris)*	Danysz 66 %, Jena 33 %
1949	Ratsouris	Jena	..	..
1950	..	..	Bait (unknown)	Danysz
1951	..	..	Bait (Ratin)	Danysz
1952	R.R.R.	Danysz	Bait (unknown)	Danysz
,,	Virus contagieux (Pasteur)	Danysz	Bait (unknown)	Danysz
,,	Ratin (British Ratin Co.)	Danysz	Bait (unknown)	Danysz
,,	Rat Poison (Scottish Ratin Co.)	Danysz	..	..
1953	..	..	Bait (unknown)	Danysz
1954	..	..	Bait (unknown)	Danysz
,,	..	..	Bait (Ratin)	Danysz
1955	Virus contagieux (Pasteur)	Danysz	Bait (Disinfestation Ltd.)	Danysz

*Six colonies from a single bait.

Inquiries at the butcher's shop and at the slaughterhouse did not throw any light on the case, and the means by which the organism got into the food and what component of the food was responsible, has not been elucidated.

The organism concerned was of the danysz type, used in certain rat poisons, but inquiries failed to establish that such poison had been used anywhere near the food.

From the explosive and widespread nature of the outbreak it seems probable that the food—most likely the meat used for the "savoury mince"—was somehow heavily infected before reaching the depot. Both in the refrigerator and in the oven the centre of the mass of mince probably did not reach a temperature sufficiently low or high to inhibit the growth of the organism, which therefore multiplied all the time (24 hours).

The standard of hygiene at the depot is very good, and I am satisfied that no blame can be attached to the staff for this occurrence.

The incident is an example of the increased risk of such outbreaks under present conditions, with large numbers of people depending on communal feeding arrangements, and the necessity for all possible care on the part of those handling food at any stage.

Outbreak Due to S. enteritidis *var.* jena

This outbreak was reported in *The Lancet* (1945). At Stoke-on-Trent a small lock-up cook-shop, supplying meat sandwiches, meat, potato pies, and cooked dinners off the premises, carried on in addition a small grocery business. The premises were infested by mice, and the occupier had been in the habit of using Liverpool Virus. An outbreak of food-poisoning occurred in relation to food sold in this shop, affecting more than 30 patients, of whom 6 died. From the patients investigated *S. enteritidis* var. *jena* was isolated. Food taken from the premises was examined, but no salmonella was isolated. *S. enteritidis* var. *jena* was isolated from a partially consumed sandwich found in the pocket of one of the patients. The Liverpool Virus used on the premises was not available for examination. A sample of this preparation was obtained and proved to be a pure culture of *S. enteritidis* var. *danysz*. Samples of Liverpool Virus had been examined in 1944 and found to contain the jena variety (table III), and possibly the preparation used in the shop was of the same type.

Animal Infections

Both the jena and the danysz varieties may affect animals, as shown in table II.

Rodent Virus Preparations

From 1944 onwards various preparations have been investigated to determine the species and variety of salmonella organisms present. In some instances the "virus" preparation was examined in this laboratory; in others the "virus" preparation or a "virus"-infected bait was examined elsewhere, and a single colony culture sent for examination. For this reason the data are presented under two headings in table III, which shows that, certainly as late as 1949, both the jena and the danysz varieties were used in "virus" preparations. Since that time only the danysz variety has been isolated from material or cultures of material received here.

In 1945 it was possible for anybody to buy "virus" preparations from retail shops, but this is now impossible. "Virus" preparations are still used by the representatives of some firms undertaking pest control. At present anyone may buy Institut Pasteur "virus" by writing to the Pasteur Institute, payment being made on an international reply coupon.

Although the only salmonella found in "virus" preparations in recent years has been *S. enteritidis* var. *danysz*, there appears to be no official control of the varieties of organisms employed. It has been shown that the jena variety was in use until 1949, and Bainbridge (1909) refers to the use of *S. typhimurium*.

The data show that the jena and danysz varieties of *S. enteritidis* are pathogenic to both man and animals. Some of these infections have been traced to the use of bacterial rodenticides both at home and abroad.

There are other more effective methods in use for the destruction of rats and mice. The Ministry of Food (1946) recommends certain methods of control but does not include bacterial cultures. Bainbridge (1909) reported a death-rate of 20–50% from bacterial cultures. It is believed that chemical poisons give a higher death-rate, and their use is recommended by the Ministry of Agriculture and Fisheries. Moreover, the chain of spread of salmonella infection, which may be through man, animals, and insects, does not exist in the case of chemical poisons.

A Working Party, of which Prof. S. Zuckerman was chairman, set up by the Ministers concerned to advise on precautionary measures against toxic chemicals used in

agriculture, made certain recommendations about using bacterial rodenticides (Toxic Chemicals Working Party 1953). These recommendations were the least which could be accepted, and, in my opinion, the use of bacterial rodenticides is unjustified because they may infect man and animals, they may constitute an uncontrollable source and chain of infection of long duration, and they are said to be not so effective as other methods of controlling rodents.

The use of bacterial rodenticides is banned in the U.S.A.

Summary

In this country between 1944 and June, 1955, *S. enteritidis* var. *jena* accounted for 1267 known cases of infection in man, of which 21 were fatal, and *S. enteritidis* var. *danysz* for 413 cases, of which 2 were fatal.

In animals *S. enteritidis* var. *jena* was isolated most commonly from guineapigs, mice, and pig glands, and *S. enteritidis* var. *danysz* from rats, guineapigs, and mice.

The use of bacterial rodenticides containing either of these organisms is no longer necessary and should be stopped.

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Air Pollution

Logan[1] has estimated that about 1000 people died in the Greater London area as a result of the fog of Jan. 4–6 this year. The fog of Dec. 5–8, 1952, was responsible for some 4000 deaths in London[2]; and, as Logan reminds us, this January's episode is the third major fog incident in London since 1948. Unhappily, further incidents can be expected so long as air pollution continues at the present rate. Indeed, we may expect things to get worse as more people, houses, industries, and petrol and diesel vehicles are gathered together.

London fogs have no exact parallel elsewhere. Previous episodes (such as those at Donora and in the Meuse Valley, or the eye-smarting annoyances of Los Angeles) are very different from the wet, thick smog of London. Drinker,[3] in an arresting article, remarks that Londoners have looked upon "pea-soupers" with a sort of friendly familiarity not shared by strangers. He recalls the two gentlemen who collided in Hyde Park during the 1952 fog. "With the formal politeness characteristic of the English, one said, 'I beg your pardon. Can you please tell me where I am going?' The other replied, 'Yes, I can—into the Serpentine. I have just come out.'"

The Clean Air Bill, which is based on the Beaver report, is now over some parliamentary hurdles. Its far-reaching provisions show that Parliament, and we hope the public, mean business now as well as in the near future. The cure for our ills is not easy, and much money and trouble must be expended. We must face the fact that we just do not know exactly what it is that makes smog lethal. Amdur's valuable work on sulphur dioxide has been criticised; and further research is a matter of the first importance. Drinker draws attention to interesting observations by Clayton[4] and others on the use of radioactive isotopes to "tag" fuels like coal and motor fuels and thus enable their presence to be detected in the air. This method might help us to decide whether sulphur dioxide and smoke in this country come mainly from domestic fires, from power-stations or other industrial sources, or from motor exhausts.

Electricity power-stations have been accused of pouring out huge quantities of oxides of sulphur. But in a paper read in New York Rees,[5] of the British Electricity Authority, discusses the effects of the ban put on "scrubbers" (for removing sulphur dioxide) during the late war because the effluent streams were steamy and made good beacons for enemy aircraft, and claims that there is insufficient evidence to justify a return to the pre-war practice of scrubbing and that nobody can measure the difference, chemically or by health surveys, whether or not the sulphur dioxide is scrubbed out. Since the process is very costly, those in charge of the power plants are opposed to its use.

In many ways, London is far behind some other large cities which have recently "cleaned" their air. Pittsburgh, for example, handles enormous quantities of raw materials in its steel mills and blast-furnaces, whose activities caused much pollution by ash, grit, and carbon particles. It can certainly be proud of its anti-pollution drive, and can point with satisfaction to the fact that a transatlantic plane was recently unable to land anywhere near New York or Boston because of poor visibility but was accommodated easily at Pittsburgh. Some less effective preventive measures have been taken in this country. Last winter the Government supplied masks to those with bronchitis, asthma, and cardiovascular disease, and these helped many patients to breathe less polluted air. Elderly persons were advised to remain indoors and if possible to rest. But little has so far been done to get rid of the cause or causes.

The scientist, the combustion engineer, and the local authority must get together to change our traditional methods of heating. Compulsion may have to be used, for Government reports and exhortations have proved to be largely ineffective. At least one line of research must be pursued further. Wilkins, of the Fuel Research Station, has devised an adjustable wick dipped into a bottle of ammonia as a means of neutralising both the sulphur-dioxide gas and sulphuric-acid mist. This method may protect humans in the same way as the pigs and sheep at Smithfield Show were protected during the 1952 fog. The scrupulously clean (and therefore non-ammoniacal) animals were seriously affected, whereas those less meticulously cared for were unharmed.

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Vaccination against Poliomyelitis

The initial batches of the British poliomyelitis vaccine have now passed their safety tests and will be used for first injections to about 200,000 children in Great Britain. These will be children born in November of each of the years 1947–54 and in March of the years 1951–54. These children will receive first injections shortly, and after about three weeks second injections. Any vaccine left over from this first distribution will be used for children born in August of the years 1947–54.

In the first phase of the vaccination programme, in May and June, it is hoped to vaccinate over 300,000 children in England and Wales and 40,000–50,000 in Scotland. The remainder of those registered will be given priority when vaccination is resumed in the autumn.

Children registered for vaccination number 1,610,899 in England and Wales and 299,144 in Scotland—29% and 42% of those eligible. Returns were received from 144 of the 146 local health authorities in England and Wales and from each of the 55 authorities in Scotland.

The Widdicombe File

XXXIII. ON A PERSONAL NOTE

MY DEAR WHIDDON,

Things are coming to a pretty pass indeed! Your precious Management Group Secretary has the nerve to claim that every letter I write to you about a patient automatically becomes the property of his hospital. It does not seem to matter even if I mark it "Private and Confidential": it is filed with the hospital records just the same. Damned presumptuous, I call it.

On the contrary, persists the Group Secretary, every general practitioner who writes a letter to a hospital consultant knows what is customarily done, and thus he implies consent for his letter to be included in the records. Stuff and nonsense, I retort; not one general practitioner in a thousand bothers to think about the consequences of writing friendly notes to help his professional brethren or his patients. More fool them, shrugged the Secretary. And that is where you come in, my dear Whiddon; for it cuts both ways.

If it is worth writing a letter at all, it takes two people to make it a success. Unless there is implicit confidence between us, the text of the letter and its sincerity will not be worth the paper it is written on, never mind the 2½*d.* stamp. None of us in our right senses are going to put down all that is in our hearts if we suspect that the fellow at the other end is allowing a bunch of strangers to peep over his shoulder. Still less are we going to be happy about the risk of our letters being bandied about by all and sundry, some of whom may be bloody-minded towards us in these compensation-worship days. Such suspicions gnaw at the very basis of the traditional confidence which ought still to exist when one doctor writes to another about a patient.

They tell me that in theory the copyright of a letter remains with its author; and, though I don't suppose many general practitioners make a habit of endorsing their letters to you "All Copyright Reserved," this could be a point worth remembering. It might prove helpful in these days when hospital records are lent to Government departments, and, on strange occasions, may even fall into the hands of the patients themselves and their legal advisers.

If we were to take a firm stand on copyright, might it not become obligatory to ask each writer for his consent before publishing his letter to any other party? That would shake the Group Secretary's office! At present they get away with their self-chosen practice of asking the consultant in charge of the case to review the records and say whether the notes can be borrowed by the laity. Now, my dear fellow, I would trust you with all my heart to do that; but I can think of one or two of your colleagues who might not be quite so acceptable, human nature being what it is. I certainly would not approve of the hospital nominating an official scrutineer for the purpose. Confidence has a personal quality, like a delicate flower to be cultivated and tended.

Delicate flowers remind me of my old Uncle George. Do you remember meeting him at the Chelsea Show before the war? He was not only an expert on orchids, he was a damned good lawyer as well. I always remember him holding forth on the subject of qualified privilege in correspondence. He used to say that a qualified privilege existed when the person who makes a communication has an interest or a duty—legal, social, or moral—to make it to the person to whom it is made, and that the person to whom it is made has a corresponding interest or duty to receive it. I think that you and I easily satisfy those conditions when I write to you about Mrs. Popplecorn. Whether I have a legal duty to do so under the mass of N.H.S. legislation I would not know without rummaging out my desk; I am sure that I must have a social duty in this age of social medicine; I certainly have a moral duty not to spin you half a tale.

But old Uncle George was careful to point out that our qualified privilege will be lost if the communication was actuated by malice. Goodness knows, there has been a wealth of gentle malice in some of my notes to you. Mrs. Popplecorn suffered far less pain in her neck than I did when I attended her. Old Colonel Firebrace was a left-handed gift to your consulting-room. Was it really malice on my part to betray their hideous characters, or was it my compassion to spare you ferreting out the truth for yourself? Perhaps we need bother no more about those finer ethical points, for Uncle George showed us that we could rebut the presumption of malice by proving that the publication to another party was made without the writer's authority or knowledge. Uncle George has been pushing up the daisies for a long time now, and maybe the law has changed since then, but all the same I think he has left us a few good tips.

When I look back I can think of some notes to you that would not have done me much good in a court of law. Do you remember the odd mistakes of my early days which I sent along to you to put right? Just fancy what would have happened if one of those got back to the patient! Somehow I feel it was better to have owned up to you about them than to subscribe to this present-day creed of writing notes for the main purpose of squaring one's own yardarm, or, in the less polite language of the Civil Service, of keeping one's nose clean. I can see that you consultants are having the same difficulties with your letters to us. Your phraseology is becoming tainted with a brand of dour caution inspired by the shadow of the Legal Aid Fund. Not only is there a danger of losing confidence between consultants and general practitioners, there is also a danger of losing the more civilised techniques of self-expression.

What, Whiddon, do you think we ought to do to protect and restore that confidence? What can we do to preserve intact the free and full exchange of information and opinion between doctors? Can we beat the enemy at their own game? I suppose that the endorsement "Private and Confidential" carries no special significance; for are not most medical documents contemptuously so marked? "Copyright Reserved" is perhaps rather too pedantic. I have a theory that a simple endorsement "Personal" might suffice to rescue my confidences from the clutches of the lay administrators; but of course you will have to put up with having your jacket pockets bulging with papers, unless you adopt some memory-man technique and swallow the notes like a first-class spy.

Another bright idea might be to copy the lawyers' device of endorsing their more scurrilous communications "Without Prejudice"; and what they get away with under that umbrella is just nobody's business, not even the court's. A system of dual letters in parallel, one stating the truth for your private eye, and the other providing eyewash for the hospital records, seems a little too schizophrenic, and fraught with the horrible possibilities of intermixture under stress in the witness-box. It would be simpler to devise a secret code if we were not so involved with security scares over atomics and space satellites.

I don't know just what the answer is, but it will be a sorry day when you and I have to write to each other about Mrs. Popplecorn on notepaper which carries on the reverse side a schedule in small type setting out the conditions of communication between us. It may give some gratification to the administrators to see us using the appropriate form. But one person at least is likely to lose rather than gain—and that person, as I need hardly say, is our Mrs. Popplecorn.

Still very hot under the collar,

Yours sincerely,
WILL COBBLEIGH.

In England Now

A Running Commentary by Peripatetic Correspondents

ONCE upon a time there was a very poor country, where nobody had enough to eat and the average expectation of life was 24 years. There was also a very rich country, where everybody had plenty to eat and the average expectation of life was 64 years. In the very rich country people used to save up milk and butter and cream and eggs and send them to the very poor country, where they were distributed, especially to the children, who would otherwise have had none. In this way the expectation of life in the very poor country was raised from 24 to 27 years. Meanwhile the expectation of life in the very rich country was rising too, and went up from 64 to 67 years, and everyone who didn't die of cancer of the lung from smoking too many cigarettes died of coronary thrombosis. Then someone discovered that coronary thrombosis was due to eating and drinking too much milk and butter and cream and eggs. So people stopped eating and drinking milk and butter and cream and eggs in the very rich country, and sent it all to the very poor country, so that the expectation of life in the very poor country might be raised high enough for them to start dying of coronary thrombosis so that they, too, could stop eating and drinking milk and butter and cream and eggs.

* * *

Attendance at a symposium in the spring, if not too slavish, is an effective tonic for those who live and work at the periphery. If the meetings are held in London a country-dweller is also subject to the extra stimuli of continued partial asphyxia and other unaccustomed features of the bustling, abrasive way of life in the capital. This year's deliberations on bacterial anatomy seemed to call for a lot of microbial vivisection of a violent kind. Here were descriptions of germs with their limbs torn away in disintegrators, whilst others had their outer walls eroded by enzymes to lay bare the naked protoplast or else thickly coated with a clinging layer of antibody. Some spoke of the behaviour of germs exposed to severe cold. Some had tried the effects of over-heating or immersion in strong brine. One experimenter confined his subjects to the airless end of a sealed capillary tube, there to swim "till the last, nastiest amino-acid was consumed." We were delightfully reminded here that a bat may nourish its wing-muscles on the same residue. In the chamber of the micromanipulator any plump bacillus may be subjected to acupuncture, though techniques for inflicting moxibustion are still lacking. If Blake had sat among the audience he might have heard the molecular screams of dismembered viruses, but the company would surely have requested the evidence of tape-recordings and an electron micrograph of the microbial mouth-parts.

A non-microbiological wife (taken to reading the journals since the rising tides of inflation cut off the evening paper) was as much diverted by the appearance of the microbiologists as by the morphology of the microbes. The feminine eye can at once distinguish on sight between the reliable and the untrustworthy. During the respectful silence that greeted a cine-film on motility came the whispered observation that the ones with tails were clearly males, while the sleek, stationary ones must be female.

The dictionary affirms that a symposium is a convivial meeting for drinking, conversation, and intellectual entertainment. Considering that most of the communications can well be read in print in the comfort of a fireside-chair, is it not worth arranging such a meeting, without the set speakers, to take place in a large tent lined with barrels? Back at the periphery now, we are working on this idea whilst coping once more with the vagaries of children, pets, gardens, clinical colleagues, and the local plagues.

* * *

Before he can arrive at a diagnosis, the Young Doctor must arrive at his patient (cf. Mrs. Glasse and her jugged hare). A major obstacle in the Practitioner's Progress is the patient's garden gate. As your correspondent lately sucked his lacerated fingers, it occurred to him that this is another topic on which postgraduate education is of no help.

The Englishman in this part of the Island surrounds his castle with such fortifications that it resembles the lair of an immured robber baron. Concealed craftily among the defence works and composed of cutting edges fastened together by barbed wire, is the garden-gate. These devices fall into two groups:

1. Those that won't shut.
2. Those that won't open.

Group 1, very rare, is a godsend to the Y.D. unless he is fighting a delaying action with one of the household's paranoic dumb chums.

Group 2 includes almost all gates not included in group 1. The Y.D. confronted with a gate in group 2 should not waste time attempting a parley with the garrison. Inevitably the Y.D. will have to "go it alone." Two lines of strategy are open to him. If he weighs-in at ten stone or under, let him produce his screw-driver and heavy wire-cutters and dismantle the gate. The Y.D. in the heavier weight-classes is advised "to retire in order to jump the better," and with (or without) a hoarse shout of "A Nye! A Nye!", to hurl himself at the gate. He will then either descend into the garden in a cloud of disintegrating wood and metal, or find himself rushing up the garden path carrying the entire gate before him, with a bow-wave of prams, milk-bottles, toys, and juvenile delinquents.

It should now be obvious why the assault direct is contra-indicated for the light-weight Y.D. The gate may be so resilient that he rebounds violently across the pavement. If lucky, he will merely drive his occiput through the side-window of his car, and the resulting scalp-wound should heal nicely in about ten days. If unlucky he will disappear under a passing bus. In either event, there will be Delay in Seeing the Patient.

* * *

The Ganglion has been promoted at about the same rate as I have. In those bad old days when I started as a casualty dresser we students were set to work dissecting them out in the outpatients' theatre during the afternoons. By the time I was a house-surgeon it was recognised, and how rightly, that this was not good enough; and I was again set to work during slack afternoons dissecting out ganglia, this time in the main theatres. Now that I have struggled into the ranks of the senior registrars I find that the ganglion is considered too strong meat for the house-surgeon and it appears once more on my list. Among the consultants the waiting-lists grow short. The heroics of the operating-theatre recede, and their places will soon be taken by humbler activities that once would have been thrown as crumbs to the registrars. I see no escape. Ganglion, you are my fate.

* * *

About five years ago I was digging in my garden on a very warm spring day when a little elf appeared. He offered to finish my digging for me, and I was only too glad to sit in the sun in a deck-chair on the lawn. Well, he soon finished that off and started clipping the hedge. To cut a long story short, he offered to look after the whole garden; and from that day on I never had to do a stroke. I used to sit out under a tree with a glass of beer and the newspaper, and the industrious little elf used to dig and delve from crack of dawn till dewy eve. He was a real glutton for work. The garden had never looked so neat and well stocked; I was the envy of my neighbours for miles around.

Then two years ago he suddenly stopped coming. Didn't say a word, just didn't turn up. I was lost. The garden went to wrack and ruin. It was a wilderness. Yesterday he turned up as though nothing had happened and started working. No apology or anything. I was livid. "Look here," I said, "where do you think you've been all this time?" "I been for me National Service," he said. "And what sort of National Service do you do, my little man?" "What? Ain't you never 'eard of the National Elf Service?" he replied.

* * *

A patient's comment on the exhibition of the Medical Art Society.—Never before have so many doctors done me so much good at one visit.

Letters to the Editor

REVISION OF THE CURRICULUM

SIR,—Professor Wyburn's letter last week is profoundly disappointing. As an advocate of radical reform of the curriculum he must surely know that such reform is impossible anywhere in this country except on the instructions of the General Medical Council, or by its permission. Both because the G.M.C. is a conservative body and because it has liberal traditions, we can rule out the possibility of radical reform being undertaken on its instructions: it is never going to adopt an "experimental" curriculum and impose it on all medical schools. Hence the only hope of getting anything done, after so many years of talk, is to persuade the G.M.C. that it can safely allow teaching authorities liberty to experiment for themselves. To say that the council is being asked to "abrogate its function as guide and supervisor of the training of medical students" is untrue: it is being asked to exercise this function in a different way, relying on advice to individual schools rather than on general directions to all.

This approach should surely have the support of all who want alterations of any kind: whether (like the Royal College of Physicians) they favour a basic medical education or (like Professor Wyburn) they prefer a more vocational and utilitarian training. For they will get neither unless the council accedes to the college's request.

If it does so, and if major reform of the curriculum becomes at last a practical possibility, it will then be important to decide in each medical school whether and how far the teachers can agree on general educational objectives. Professor Wyburn may then be able to carry the day in his own school, without having to enforce his views throughout the country. This would be greatly to the satisfaction of those, such as myself, who are not so convinced as he that there is only a single remedy. I do not believe that a curriculum is ever likely to be perfect in concept or application in any school, and I therefore am wholly in favour of the "interminable 'research'" that he condemns. He may be correct that the training for lawyers is not so subjected, but the law does not change so rapidly as medicine. On the other hand, if true, it is distressing to hear that the trainings for engineers and for scientists are not regarded as being in need of constant review aimed at improvement. I do not personally consider that our knowledge of learning processes or our application of it justifies such complacency.

It is, of course, entirely untrue to state that the curriculum is not considered by those whom Professor Wyburn describes as "best suited to advise"—the general practitioners. Clearly he has not seen fit to study the published opinions of the College of General Practitioners. This is extremely unfortunate, for had he done so he would have discovered that not all who are actually engaged in this branch of medicine regard themselves as merely skilled technicians. Nor do they all favour a purely utilitarian training—irrespective of the fact that were it to be adopted for all, some 50% of students (who do not later enter general practice) would thereby be given a curriculum much of which might, as Professor Wyburn claims is the case at present, be "wholly irrelevant to the work subsequently undertaken."

Furthermore it appears to me that many general practitioners do not find "the job" easy to define dogmatically, but are convinced that what the people need is a doctor who is not only conversant with the common knowledge and proficient in the common techniques that are current at the time of his registration, but is also capable of learning new knowledge and new skills. (It must be admitted that the general practitioner is at least as well placed as a professor of anatomy to know what "the people want.") Perhaps Professor Wyburn's own single positive contribution—that the education of the medical student should "include, from an early stage, a concurrent and remunerated apprenticeship"—is intended to achieve this aim; but as it stands it is no more than a bare "pronouncement," and does not even make it clear whether the remuneration should be additional to the present system of grants and subsidies.

The Royal College of Physicians was asked to amplify its original memorandum,[1] and it has done so. It has reiterated its request that the G.M.C. should abandon control by prescription *in order to foster experiment*, and Professor Wyburn is entirely wrong in suggesting that the college has done this in order to impose a "model curriculum" of its own upon anyone.

To me he seems equally wrong in suggesting that the college has nothing else positive to add to the pronouncements so often made in the past. He may note that, in describing the kind of framework within which it thinks the schools should design their own curriculum, it says that preclinical studies should not start till 18, and that exemption from the 1st M.B. should be obtainable by students taking only two scientific (and one non-scientific) subject at advanced level in the G.C.E. In discussing the implications of a basic medical education, it points out that any school which wants to integrate preclinical and clinical studies will have to be prepared to alter the 2nd M.B., and it asks the council to refrain from issuing any general instructions on the content or timing of examinations, because this "might prevent the development of a method of progressive assessment which could be an alternative to the present examination system." There are many in the profession who share the college's belief that "at all stages of medical education, examinations now exercise an unhealthy dominance over the students' work and thought." Do they realise that nothing can be done about this dominance until a progressive medical school has been allowed to demonstrate that equally good (or better) doctors can be produced on some different system?

The college is asking that if the teachers of any school believe they can improve their course—and can agree on how to do it—they shall have freedom to try. Does Professor Wyburn really want to dissuade the General Medical Council from taking what has been rightly called the "essential first step towards reform"?

London Hospital, E.1. JOHN R. ELLIS.

SIR,—The letter by Professor Wyburn will be widely read with gratitude for its authoritative and robust common sense. How refreshing to read that crucial statement "the people want a doctor who knows his job." So many of our academic medical ornaments seem to discover the truth of the statement only when they, or their families, fall ill. Again, the manifestly true, but politically most dangerous, conclusion that "the present training of the medical student is unsatisfactory, uneconomic, and much of it wholly irrelevant to the work subsequently undertaken by the great proportion of medical graduates" leads one to fascinating musing on the theme: what happens if public money voted for one object is used for another—however desirable in itself and even if this object be removed from critical appraisement by the inhibitory label "research."

Again; medicine is "not a science" but "a skill, much of it still empirical" and the inevitable conclusion, clearly stated—"apprenticeship." Great is the truth—may it prevail.

1. *Lancet*, 1955, ii, 132.

Dumbfounded, I was unable to detect—even on repeated re-reading—the reverential awe usually accorded to pronouncements of the Royal College of Physicians—in the present instance unassisted, it seems, by any other earthly body.

Since large sums of public money are involved I hope the publication of Professor Wyburn's letter may assist those who are attempting the heartbreaking task of opposing specialised interests in order to render the training of medical students "economic," and thus to produce a doctor confidently consulted when one is ill.

Sheffield. JOHN L. EDWARDS.

WHOLE-TIME SPECIALISTS

SIR,—I should like to say how much I approved of Dr. Gilchrist's masterly résumé (April 14) of the situation that now confronts full-time specialists—consultant and S.H.M.O. alike.

The inequalities and injustices which he lists are unlikely ever to be righted until *adequate* representation for the non-teaching full-time specialists is obtained on the Joint Consultants Committee (which is also in practice the staff side of Whitley B).

This committee is the only body that negotiates with the Ministry and the management side of Whitley B on behalf of the specialist services. It is an autonomous body, and in particular it is not responsible to the Central Consultants and Specialists Committee. There have been, in fact, occasions when the Joint Consultants Committee have altered documents or policies which have previously received approval in the regional and central consultants organisation (the Strachan report on hospital staffing is an outstanding example).

It is extremely difficult for the full-time consultant and S.H.M.O. to see why their reasonable request for adequate representation on the Joint Consultants Commiteee is resisted. The reasons given are usually three:

(*a*) That it is a mistake to introduce sectional interests on to this committee.

(*b*) That the full-time specialists have opportunity through the regional machinery that finally produces 6 members of the Central Consultants and Specialists Committee on the Joint Consultants Committee to get their representatives elected.

(*c*) That alteration of the present machinery would result in "splitting" of the profession.

None of these "reasons" seems to me valid or even true. The first, about sectional interests, begs the question entirely. It is difficult to see what particular quality part-timers have that make them less likely to be partisan than the full-timer. The results of the past eight years' negotiations have been much to the advantage of one section—and that is the section that practically monopolises the representation.

It is true that the full-timers could obtain representatives by the regional machinery. Their numbers are nearly equal to the part-timers' and they would have the support of 1200 part-time S.H.M.O.s whose interests march with theirs. But this would mean a deliberate electoral campaign in the regions: the displacing of many valuable men who are now representatives and ill feeling between the two sections. At the end they would obtain a share of the 6 seats on the Central Consultants and Specialists Committee and would still be outnumbered by the 11 representatives of the colleges. This solution would indeed mean "splitting."

As to the third reason, I submit that the exact opposite is true. It is the consistent discouragement and the refusal of his reasonable requests that will drive the full-timer to a split. This seems more and more likely to happen.

The solution would be to enlarge the Joint Consultants Commitee to 23 and give the 6 extra places to the full-time specialists. This would ensure that their viewpoint was adequately heard and at the same time correct the present overbearing representation of the colleges. Such a committee would present a united front to the Ministry and represent the whole specialist services.

As this graceful gesture by the Joint Consultants Committee seems highly unlikely, I support Dr. Gilchrist's suggestion of a full-time-specialist group. We must get our representation the hard way.

Derby. G. HOWELLS.

ADRENALECTOMY FOR VASCULAR DISEASE OF DIABETES

SIR,—While I agree with much that Dr. Malins says in his article last week, there are two points which, I think, require modification.

In the first place he quotes me as saying, in a personal communication, that hypophysectomy may produce intractable hypoglycæmia. My experience of this operation is limited to one case in which severe hypoglycæmia occurred after operation, but the fact that the patient is still alive and well one year later makes the word "intractable" inappropriate.

Secondly, I cannot agree that there is sufficient justification for the statement that "it seems certain that retinopathy will develop in every diabetic who lives long enough, and that the final stage of blindness will arrive in those who do not succumb to renal failure before their sight fails." Both Dr. R. D. Lawrence and I have seen a number of patients who have had diabetes for thirty years or more and are completely free from complications; I see no reason why these patients should develop either retinopathy or nephropathy. Dr. Joslin, of Boston, also has many such patients and indeed gives them a victory medal.

There would seem to be a group of long-standing diabetics in whom such complications are absent or minimal, and, until more is known of the ætiology of the complications of diabetes, such a dogmatic statement as that made by Dr. Malins seems to me to be unduly pessimistic.

London, W.1. WILFRID OAKLEY.

PERFORATED ACUTE AND CHRONIC PEPTIC ULCER

SIR,—I read with interest the latest results of conservative therapy published by Mr. Hermon Taylor and Mr. R. P. Warren (April 14) and note that they confirm the fundamental difference in the prognosis of perforations in acute and in chronic ulcers to which I drew attention in presenting the results of primary suture in 1953.[1]

In discussing the immediate-mortality rates they argue that there is little to choose between the two methods of treatment. I must, however, correct their statement that my series of 206 perforations was "a selected group of operable cases," for this is a misconception. My cases were the consecutive admissions of all the perforations which came into my wards on my receiving days during the period under review. There was no selection, and although some were very ill none was refused the chance which operation offered. The mortality of that series—6·3%—must therefore stand. The records' officer at the Royal Victoria Infirmary tells me that during the past five years 942 patients with perforated peptic ulcers were admitted to the hospital: of these, 41 died after operation (4·4%) and 20 were moribund on admission and died without operation (2·1%), giving a total mortality of 6·5%. In 1955 the figures were even better: there were 156 perforations; none of these patients was admitted moribund and 6 died, giving a total mortality of 3·8% for this series.

Results of this kind amply justify the continued employment of laparotomy and primary suture as the

1. *Lancet*, 1953, i, 870.

basic method of treatment. It has the advantages of precision and the immediate correction of possible diagnostic errors, and it preserves that sense of urgency in treatment on which early admission to hospital depends. Conservative therapy has been used in those mild cases diagnosed as "leaking ulcers," and in others where the early diagnosis has been in doubt. Some of these have been acute exacerbations of peptic ulceration or of antral gastritis, without perforation.

Primary partial gastrectomy has been preserved for perforation in chronic ulcers in selected patients whose general condition has remained good and in whom diffuse peritoneal soiling has been absent, but the ultimate decision to proceed with this operation may have to be abandoned when the ulcer is exposed if conditions are unfavourable. The plea is, therefore, for an accurate assessment of each case and the adoption of the procedure calculated to give the best results in the experience of the surgeon concerned.

The claim that conservative therapy in perforated acute ulcers protects against relapses is one which only time can confirm, but it seems contrary to the nature of the disease.

Newcastle upon Tyne. JOHN GILMOUR.

INFLATABLE POSTNASAL TAMPON

SIR,—Mr. Mawson describes (April 21) an inflatable postnasal tampon. There are two points in which this apparatus might be improved.

For many years I have used a fine metal tube, over which is tied a large-size rubber finger-stall; this can be inserted into the nose and inflated to control hæmorrhage. A spring-loaded valve, similar to a motor-tyre valve, is incorporated in the proximal end of the fine tube and housed in a small light aluminium cylinder measuring 1 in. by 1/4 in. This is, of course, self-closing after each puff of air is introduced and avoids the necessity of closing a piece of rubber tubing with a cross-action spring-clip, or with a rubber cap, and is much more comfortable to wear.

The second point is that if a double bulb is used for inflation similar to that employed for inflation of a cuff on an endotracheal tube, the pressure in the balloon or finger-stall can be more easily gauged. This apparatus may be obtained from Messrs. A. L. Hawkins, of New Cavendish Street, London, W.1.

Royal Free Hospital, London, W.C.1. W. G. SCOTT-BROWN.

RESTRICTION OF ANTIBIOTICS

SIR,—I was very surprised by the opinion expressed in your annotation (March 3).

In point of fact, restriction on commercial distribution of an antibiotic seems to me detrimental to the public health. The object of pharmaceutical firms is to supply the physician with new medicines, and it is up to these to choose the antibiotic best suited to each particular case. The clinical and, more specially, the laboratory data (antibiograms) supply precise information. Consequently, it appears to me that the more antibiotics a doctor has at his disposal, the easier it is for him to apply rational and effective treatment.

If we adopt the course you favour, on what basis, and when, can a new antibiotic be placed at the physician's disposal?

You mention an antibiotic on sale in France with, you say, insufficient reason. Spiramycin (it is obviously to this antibiotic that you allude) has effective antibacterial properties rather similar to those of erythromycin, but clinical and laboratory data have shown that the similarity is not complete.

I studied 50 different pathogenic staphylococcal strains, of which 42 were equally sensitive to each of the two antibiotics, 6 were resistant to erythromycin and sensitive to spiramycin, and 2 were sensitive to erythromycin and resistant to spiramycin. Similar studies by other workers confirmed this, and it seems that 10% of staphylococcal strains are sensitive to spiramycin and resistant to erythromycin. This discrepancy was borne out clinically, and there is evidence of success with spiramycin after failure with erythromycin.

In our experience, spiramycin is better tolerated both digestively and generally at a daily dose of 3 g. than erythromycin at 2 g. daily. This advantage was pointed out also by Sureau et al.[1] who compared the results of treating scarlet fever by spiramycin and erythromycin.

This justifies my point of view and the therapeutic interest in this new antibiotic. In combating infectious diseases, each new weapon must be well known by the practitioner and placed at his disposal for his discerning use. And obviously a patient infected with an erythromycin-resistant and spiramycin-sensitive organism (which from French observations will be once in about every ten cases of staphylococcal infection) would be extremely glad to benefit by this effective and well-tolerated medicine.

Tassin-La-Demi-Lune, Rhône, France. J. PELLERAT.

*** As we see it, hospitals are experiencing an epidemic of antibiotic-resistant staphylococcal infection, which may spread to the general population. In the face of such a threat to the public health we do not think that the policy of laissez-faire advocated by Dr. Pellerat will be indefinitely acceptable either to peoples or to their governments. Our plea is that the medical profession and the pharmaceutical firms should coöperate voluntarily in measures to discourage the emergence of resistant strains.—ED. L.

HORMONAL EFFECTS OF TRANQUILLISERS

SIR,—The interesting letters of Dr. Sulman and Dr. Winnik and of Dr. Marshall and Dr. Lieberman (Jan. 21) accorded with certain of our own observations. During the past month, while examining a Papanicolaou smear obtained from the cervix uteri of a 68-year-old patient who had had some recent bleeding episodes, we were amazed to find cornification of vaginal epithelium to a degree which suggested that the patient was receiving œstrogen therapy. That, we were assured by her doctor, was not the case. The patient had for some months been receiving only rauwolfia alkaloids, and it turned out that the bleeding coincided with the exhibition of this medication.

In an investigation by one of us (R. D. B.) of the tranquilliser, meprobamate ('Miltown,' 'Equinil'), in patients with inoperable neoplastic disease,[2] a patient with mediastinal and cervical Hodgkin's lymphadenopathy, previously responsive to hydrocortisone and to oxytetracycline in successive courses, but now refractory to both, showed progressive detumescence of the enlarged nodes in the first three weeks of sustained administration of miltown (400 mg. by rectal suppository four times daily) administered for the control of anxiety. This response was reminiscent in all respects of prior responses to adrenocorticotherapy or mycin antibiotics—in the case of one of which (chlortetracycline) humoral action has been confirmed.[3] It may be recalled that an "adrenocorticomimetic effect" of this class of antibiotics has often been suggested to explain certain effects in diseases which are not classically "infective."

Experience with meprobamate indicates that the humoral effects of tranquillisers may not be confined to an anti-histamine or parasympatholytic one, as with chlorpromazine. Nor is it certain that such effects do not

1. Sureau, B., Chabbert, Y., Veron, M., Martin, E., Cayla, E. *Pr. méd.* 1955, **63**, 1615.
2. Kessler, L. N., Barnard, R. D. *Med. Times, N.Y.* (in the press).
3. Trams, E. G., Kashiwa, H. K., Cornman, I., Klopp, C. T. *Antibiot. Med.* 1955, **2**, 677.

contribute as much to their therapeutic action as their known effects on the thalamic structures. It must be remembered that severe somatic pain may frequently be relieved by cortisone, and that the emotional upsets of the climacteric sometimes respond to œstrogens and/or androgens.

Again, we have found that administration of meprobamate causes changes in fæcal flora from a proteolytic to a saccharolytic type—a change to which the humoral effects of antibiotics have been ascribed [4 5] and which have also been invoked to explain the dry-weight gain of domesticated non-ruminant animals ingesting them. This explanation must be re-examined in the light of a study at the Loblund Institute showing acceleration of growth-rate in germ-free poultry fed antibiotics.[6] Meanwhile an interesting common denominator underlying hormones, antibiotics, and tranquillisers seems to be emerging. Patients on rauwolfia or meprobamate frequently show the voracious appetite and weight-gain found in patients under treatment with antibiotics. The mental effects of isoniazid [7] are now well known, and insomnia and enhanced psychomotor activity has been observed in some patients on long-term treatment with streptomyces-derived antibiotics.[8] It was in fact this complication of sustained antibiotic administration that led to routine administration of meprobamate in a series of patients with inoperable neoplastic disease to whom antibiotics were being administered [9]; and this therapy has commonly modified the humoral effect of the antibiotic,[3] sometimes in the direction of enhancement.

In acute experiments on unanæsthetised dogs, reserpine has been shown to augment hydrocortisone output of the adrenals [10]; this effect is more intense and rapid on chlorpromazine administration (D. M. Hume, personal communication). While the investigators who report this stipulate that no conclusions can necessarily be drawn regarding similar effects from clinical administration, we believe these to be forthcoming.

Laurelton, Long Island, New York, U.S.A.

ROBERT D. BARNARD
ELIZABETH H. BARNARD.

MENOPAUSAL PANNICULOSIS

SIR,—Referring to your valuable annotation (April 21) on menopausal panniculosis, which as Dr. Baker says is a much better name than panniculitis, the practical problem has always been to decide on the most suitable diet: whether in fact the increased weight is partly due to water retention, or is entirely fatty. The problem can be solved by recording the weight for several days, then making the patient drink an appropriate amount of an exchange resin. A drop in weight indicates whether water retention is a factor and to what extent. The exchange resins are, however, very unpleasant to take in water, and I am not satisfied that eating biscuits made of the stuff, though helpful in treatment, would give a clear-cut indication of the trouble.

Recently I have used acetazolamide ('Diamox'), giving 250–500 mg. (according to the weight) to thirty patients, all with possible water retention. As with the exchange resin, the weight is recorded daily for several days, on one of which the drug is taken first thing in the morning. Patients with severe water retention will have lost as much as 4 lb. by the next day, though 2–3 lb. is the most usual. On the other hand, no drop in weight denotes that retention of water in the tissues does not play a part in the panniculosis syndrome and the low-sodium diet usually prescribed is needless.

Of the thirty cases, seventeen were positive to the test and were put on the Földes [1] diet with acetazolamide 250 mg. once a week.

My thanks are due to Messrs. Lederle for a supply of 'Diamox' tablets.

London, W.1. H. WARREN CROWE.

TRANSPORTING PATIENTS WITH BULBAR OR RESPIRATORY PARALYSIS

SIR,—Dr. Scott and Dr. Knox (April 21) perform a valuable service in emphasising that patients with paralysis of swallowing or of respiration, or both, should be under medical supervision when they are transported to the hospital where they are to be treated. They suggest, however, that patients with established paralysis of swallowing and slight respiratory involvement should have a tracheotomy before they are moved. In our experience such patients can be moved easily and safely if a cuffed endotracheal tube is first passed under local anæsthesia. The tracheotomy can then be done under good conditions on arrival at the final hospital, and the difficulties and danger of an emergency tracheotomy in a small hospital or in the patient's home are avoided.

Department of Neurology and Nuffield Department of Anæsthetics, Radcliffe Infirmary, Oxford.

J. M. K. SPALDING
A. CRAMPTON SMITH.

Parliament

Unemployed Doctors

ON April 24 Dr. DONALD JOHNSON reminded the House of Commons that 35 doctors are drawing unemployment benefit. This figure he believed represented a much larger number who, for obvious professional reasons, were not attending the employment exchange, but were hanging about, either unemployed or under-employed, hoping for something to turn up. It represented, too, a still larger number of doctors working as assistants in jobs without prospects. It was not correct to say that these unemployed doctors were down-and-out and good-for-nothing. Young men were qualifying and older men were returning from overseas, and they were unable to find places in the National Health Service. It might be that more doctors were qualifying at present than were needed, but he suggested that the difficulty was really due to the falling-in of practices. In the old days in every purchase and sale there was an agreement for goodwill to be handed on, and there was an incentive for the vendor, or the widow of a deceased doctor, to keep the practice together. Now there was no incentive to do so. A vendor gave notice and left, and the widow of a doctor who died suddenly had no particular interest in the practice and might create difficulties by holding on to the house. It was left to executive councils to select a successor. It was equally difficult for a doctor to establish himself in an under-doctored area. He still needed money for a house, and with uncertain prospects he was not a good risk for anyone to advance money on mortgage. In view of the ever-expanding need for medical attention in the country something should be done to make the fullest possible use of the medical man-power available.

Miss PATRICIA HORNSBY-SMITH, parliamentary secretary to the Ministry of Health, felt that Dr. Johnson had painted too gloomy a picture. Medicine was an entirely independent profession and the Minister of Health was not responsible for ensuring that every doctor was employed. The profession would certainly fight to retain the liberty of choice as to the type of practice doctors might enter or the places where they should practise. In the general-practitioner service most doctors were appointed by other doctors in partnerships. A few

4. Barnard, R. D. *Lancet*, 1951, i, 1157.
5. Barnard, R. D. *N.Y. St. J. Med.* 1950, **50**, 1852.
6. Luckey, T. D., Gordon, H. A., Wagner, M., Reyniers, J. A. *Antibiot. Chemother.* 1956, **6**, 36.
7. Barnard, R. D. *Med. Times, N.Y.* 1953, **81**, 104.
8. Barnard, R. D. *Lancet*, 1952, i, 612.
9. Barnard, R. D., Kessler, L. N., Kershner, D. *Int. Rec. Med.* (in the press.)
10. Egdahl, R. H., Richards, J. B., Hume, D. M., *Science*, 1956, **123**, 418.

1. Földes, E. New Approach to Dietetic Therapy. Boston, Mass., 1933.

appointed themselves by opening up a single-handed practice, while a small number came into the service through vacancies advertised by local executive councils. Over 60% of doctors in general practice in the service were working in partnership and they appointed their own successors and their own replacements. Single-handed practices, which were large enough to be retained as such, were advertised and went to doctors in open competition. Clearly it could not be laid down that any particular doctor, employed or otherwise, must have an automatic right to a vacant practice.

The number of doctors in practice was certainly not decreasing. In 1955 259 practices had become vacant owing to death, retirement, or resignation. 117 successors were appointed; 17 practices were amalgamated with other small practices, leaving a residue of 125 dispersed. Some of these were single-doctor practices which had been given up owing to the death of the doctor. Of the practices dispersed, 40 had no patients on their lists; 51 had under 300 patients, and 14 had lists of 700 or more, but in most of them certain significant factors applied, such as diminishing population. During the year 613 doctors were admitted to the list to practise in partnership. Of these, 297 were assistants entering into partnership in practices where they were already working.

Most of the doctors recently registered for unemployment benefit were registered for under 13 weeks and only 2 for over 26 weeks. There were great difficulties in finding vacancies for some of the 35 unemployed doctors. Some were severely disabled.

In some spheres, however, there was still a shortage of doctors. The number of doctors employed in the hospital service in England and Wales, which it was estimated was about 13,500 in 1949, had risen by 3000, and was still rising. In many areas it was difficult to find registrars, junior hospital medical officers, senior house-officers, and house-officers. Some senior registrars had had difficulty in obtaining consultant appointments, especially in general medicine, general surgery, orthopædics, and obstetrics and gynæcology. In anæsthetics, radiology, and mental health there was still a shortage of candidates for consultant posts.

While there was evidence of some maldistribution of medical man-power as between the specialties there was no evidence of any real unemployment among doctors generally. The Waverley report made it clear that the medical branches of the Armed Services had been unable to recruit enough medical officers for regular and short-term commissions. In England and Wales in 1955 there were 84 advertised vacancies in general practice and the average number of applicants was 43. Many of the applicants were already in practice and were applying for what they thought was a more favourable area. In the north of England there were often as few as 10 applicants for a vacancy; in the south the number might reach 100. There were only about 1500 assistants working for general practitioners in the service and it was clear that the turnover from assistant to principal was normally quite fast. Of the assistants who had been in post for one year or two years in 1954 there were 53% who changed their status. Nearly 75% of the assistants were in the age-group of 30 to 35.

Because of the future possibility of an over-production of doctors a committee on medical man-power had been set up under the chairmanship of Mr. Henry Willink to study the future needs of the service, and perhaps the expansion of certain specialties, such as mental health. But the evidence which the Ministry had at present did not warrant the suggestion that there was severe unemployment among doctors.

QUESTION TIME

Fall in Milk Consumption

Replying to a question, Mr. HEATHCOAT AMORY, Minister of Agriculture, Fisheries, and Food, said that production of milk in the first three months of this year had increased much more than consumption and the amount of milk becoming available week by week was causing anxiety to the Milk Marketing Board. The average monthly consumption of fresh milk in 1951 was 130·57 million gallons and in 1955 126·36 million gallons. The Milk Marketing Board, through the National Milk Publicity Council, were taking vigorous steps to encourage sales of milk and the Government were supporting the Council. In answer to a further question, he added that the Government felt they could not justify subsidising an article, even an article as good nutritionally as milk, to the extent to which they had been subsidising it to every man, woman, and child in the country, regardless of means and needs.

Milk Tablets in Schools

Replying to a question, Mr. DENNIS VOSPER, parliamentary secretary to the Ministry of Education, said that 129 schools were now being supplied with milk tablets as a substitute for liquid milk. Apart from 18 small isolated schools which no-one was prepared to supply, 111 were in Blackpool and Newport where the local education authorities had been unable to obtain fresh milk at a reasonable price. It was the desire of the Minister that liquid milk should be supplied, but there were cases where this was not always possible.

Pensions for Elderly Doctors

Replying to a question, Mr. R. H. TURTON, Minister of Health, said that about 800 National Health Service doctors were still in practice who were over 61 years of age when the National Health Service Act came into force. These doctors could not satisfy the ten-year qualifying period for a pension. Those with five years' service might, however, qualify for a lump-sum retiring allowance. Under the regulations he had no power to do anything for those with less.

Abolition of Flogging

Replying to a question, Major GWILYM LLOYD-GEORGE, the Home Secretary, said that the tendency was definitely for the crimes for which flogging was formerly awarded to drop. Though there were queer fluctuations from year to year this tendency persisted. Before corporal punishment was abolished as a judicial penalty in September 1948, the principal offences for which it could be imposed were robbery with violence, armed robbery, and robbery in company with others. The number of these offences known to the police since 1945 were:

1946	804
1947	842
1948	978
1949	860
1950	812
1951	633
1952	790
1953	754
1954	604
1955	578

Average Cost of Prescriptions

Replying to a question, Miss HORNSBY-SMITH said that the average cost per prescription in England and Wales was 4*s*. 4·87*d*. for February, 1956, compared with 4*s*. 2·09*d*. for February, 1955.

Certification of a Mental Defective

Dr. BARNETT STROSS asked the Minister whether he had noted the case of Vivienne Donger, now at Stallington Hall Stoke-on-Trent, who was alleged to have been certified as a mental defective at the age of 11 years, only because her parents had parted and she later was considered to be educationally backward; and if he would bring these facts to the notice of the Board of Control.—Miss HORNSBY-SMITH replied: The grounds for certification in this case were that the girl was mentally defective and the subject of a report under the Education Acts that she had been found incapable of receiving education at school. The Board of Control are satisfied that for the present she needs the care and training provided under the Mental Deficiency Acts. Dr. STROSS: Has the hon. Lady seen the type of letter which this girl is alleged to have written and which was published recently in a Sunday newspaper? If so, does she think it is the sort of letter which a mental defective could write?—Miss HORNSBY-SMITH: I have seen the press item referred to. This girl is being tried out on employment in domestic service, and if that is satisfactory further consideration will be given to the case. Dr. STROSS: If there be substantial grounds for believing that this girl was wrongly certified, how are we to have any protection to ensure that this type of thing does not take place frequently?—Miss HORNSBY-SMITH: The hon. Member has missed the point I made in my initial reply. This girl was certified as a mental defective after being found incapable of receiving education at school, which is the normal process. The procedure was not on the basis which the hon. Member implied.

Obituary

ALAN SEYMOUR PHILPS
F.R.C.S.

Mr. Seymour Philps, surgeon in charge of the eye department of St. Bartholomew's Hospital, died at his home in London on April 26, at the age of 50.

He was the son of John Philps, a former editor of the *Financial Times*, and he was educated at Aldenham School and St. Bartholomew's Hospital. After qualifying in 1929 he became house-surgeon at Barts to the late George Gask. He took the F.R.C.S. in 1931. For a time he worked on the staff of London Passenger Transport Board, but he was already interested in ophthalmology and after holding house-appointments at the Royal Westminster Eye Hospital he became in 1932 out-patient officer at Moorfields. Later he returned to Barts as registrar in the eye department and he also joined the staffs of the Victoria Hospital for Children, the Miller General Hospital, and the Royal Westminster Eye Hospital. In 1934 he became chief assistant in the eye department at Barts and in 1940 a full surgeon at Moorfields.

[*Lafayette*

During the late war he was an adviser in ophthalmology to the War Office and as an ophthalmic specialist in the R.A.M.C. he took part in the Normandy landings. "My chief impression of that time (he later wrote in our peripatetic columns [1]) is feeling 'This is none of I,' as one did things no middle-aged oculist ought to do, such as wade through the French surf at dawn in charge of a section of 12 men."

In a D+3 battle-dress, in which stains of blood, oil, and flavine fought for the upper hand, he paid a flying visit to liberated Paris before setting off to convoy 20 trucks across France to Belgium. "This ignorant oculist (he relates), more used to removing fragments from the cornea than convoying three-ton trucks, had imagined that anything as big as a lorry would be difficult to lose, but the trouble was to find any of them. We made bad time, and still had 100 miles to go on the last day, but when we started at dawn someone had chalked on the front truck, BRUSSELS OR BUST, and that was how we all felt."

Back in the quieter atmosphere of Harley Street and Charterhouse Square, he settled down to the more orthodox aspects of ophthalmology, and in 1948 he was appointed surgeon in charge of the eye department at Barts. In 1949 he also renewed an early interest when he became adviser in ophthalmology to the Ministry of Transport. In 1950 he published his *Ophthalmic Operations*, beautifully illustrated with his own drawings and photographs.

G. B. writes: "Ophthalmology's attraction for Philps was a logical result of his personality. He was fascinated by the delicate, the intricate, and the precise. He was a first-rate cabinet-maker, and a magnificent draughtsman of tiny and delicate subjects. The accuracy and beauty of his water-colour drawings of the fundus of the eye were only equalled by the precision and neatness of his surgery on that organ. A brilliant operator and careful clinician, he was also a clear and good teacher, and his organising powers equalled his other talents.

"As a medical student he was called 'Streak,' and this name stuck to him. He was always thin in build, but in the nickname there was also an appropriate connotation of speed and lightning brilliance of mind, speech, and body. His death at the age of 50 is cruelly premature. He had potentially so rich a store of personal and professional qualities as yet unexpended. His reputation was already international, and friends in Australia, the United States, and the European countries will lament the passing of a sparkling friend and a fine colleague. His book on *Ophthalmic Operations* stands as a record of his achievement; but the memory of his personality, so richly endowed with flashing humour and with great gifts of sympathy and kindness will live in the hearts of his friends when operative techniques have been modified or superseded.

"Not the least is Philps's memory linked with the virtue of great courage. Two years before he died he knew that he suffered from a mortal illness. But this caused neither weakening of his purpose, nor the reaction of bravado. He remained his poised, sincere, cheerful self until his last hour. He leaves a wife, to whom he owed much, and five children."

1. *Lancet*, 1944, ii, 514.

Medicine and the Law

Procedure of the Medical Disciplinary Committee

Dr. Ong Bak Hin, of Malaya, appealed to Her Majesty in Council from a determination of the Medical Disciplinary Committee on Nov. 25, 1955.[1] The formal charge before the committee alleged that in 1953 he had been convicted in the High Court of Malacca of having unlawfully performed an operation of abortion which caused the death of the patient. The committee adjudged the appellant guilty of infamous conduct in a professional respect and directed the registrar to erase his name from the Register.

Lord TUCKER, giving the judgment of the Judicial Committee of the Privy Council (Lord Oaksey, Lord Tucker, Lord Cohen, Lord Keith of Avonholm, and Mr. L. M. D. de Silva), said that at the inquiry the appellant's solicitor submitted at the outset that justice could not be done to his client unless the witnesses who had given evidence at his trial were called to give oral evidence before the committee. The legal assessor pointed out that the committee had no power to compel the attendance of witnesses from Malaya and advised the committee to proceed on the documentary evidence. The solicitors on each side drew the attention of the committee to such portions of the evidence as they considered relevant, but it was agreed that the committee should be at liberty to look at any parts they wished. It was contended before their Lordships by counsel for the appellant that the proceedings at the inquiry were defective and not strictly in accordance with the rules of procedure which governed the committee and that the determination should be set aside. He further submitted that if the notes of evidence were received they should all have been read out before the committee and that failing that the committee should have read the entire evidence themselves which, he said, they could not have done in the time available having regard to the length of the hearing.

His Lordship then referred to relevant sections of the Medical Acts of 1858 and 1950 and to the Medical Disciplinary Committee (Procedure) Rules, 1951, made under the latter Act, and to rule 63 thereof which provided:

> "The Committee may receive any such oral or other evidence as would be receivable in a Court of law, and in addition may, after consultation with the Assessor to the Committee, treat any statement of fact contained in any document as evidence of that fact."

The position of the General Medical Council in relation to its disciplinary powers under the Medical Act of 1858 was considered by the House of Lords in General Medical Council *v.* Spackman ([1943] A.C. 627). The

1. See *Lancet*, 1955, ii, 1187.

observations in that case were—subject to the effect of the Rules of Procedure—applicable to such a case as the present where the conviction, not having taken place in the United Kingdom or the Republic of Ireland, was only prima-facie evidence of the infamous conduct alleged. In so holding their Lordships had not lost sight of the changes produced by the Medical Act, 1950, in the position of the Medical Disciplinary Committee, as compared with the General Medical Council under the Act of 1858. The committee, however, were not a court of law but a domestic forum charged in certain cases, of which the present was one, with the peculiar duty of making "due inquiry" into the circumstances attending the conviction in a distant country of a medical practitioner with a view to deciding—of which they alone were the judges—whether he had been guilty of infamous conduct in a professional respect. That duty they could not adequately perform unless they were in possession of the whole of the proceedings in the criminal court in which the conviction occurred. It would be unfortunate if they had precluded themselves from so functioning by the rules, and in particular by rule 63. The record of proceedings was, in their Lordships' opinion, a "document" within the meaning of the second limb of rule 63. The admissibility of such documents was, however, limited to the statements of fact contained therein, and such a restriction might render the task of the committee and legal assessor extremely difficult in dealing with the record of proceedings in the criminal court and would exclude the judge's charge to the jury and other parts of the record which it was clearly desirable the committee should see.

In the present case the record, with certain excisions, was put in by consent as soon as the committee had quite properly decided that the attendance of the witnesses from Malaya was not practicable and that their absence did not vitiate the proceedings. The consent to the admission of the record was fatal to any objection on that score now being put forward; nor did their Lordships consider that there was any substance in the contention that the whole of the evidence was not read out in court. Their Lordships desired, however, to draw the attention of those concerned to the desirability of an alteration in the Rules of Procedure whereby the committee could be empowered beyond all question to receive in evidence and examine the whole of the officially authenticated proceedings of the convicting court in this class of case.

There had been no miscarriage of justice in this case and their Lordships had accordingly humbly advised Her Majesty that the appeal should be dismissed.

Ong Bak Hin *v.* General Medical Council—*Judicial Committee of the Privy Council:* March 19; April 24, 1956. Counsel and Solicitors: J. R. Cumming-Bruce and R. Barr (Hempsons); J. G. S. Hobson (Waterhouse & Co.).

CHARLES CLAYTON
Barrister-at-Law.

Appointments

EGERTON, A. S. W., L.R.C.P.E.: S.H.M.O. in venereology, Liverpool Royal Infirmary.

HARTLEY, MARY J., M.B. Leeds, F.F.A.R.C.S., D.A.: part-time consultant anæsthetist, City General Hospital Sheffield.

PATTINSON, J. N., M.B. Camb., F.F.R., D.M.R.D.: consultant radiologist, The Middlesex Hospital, London.

TOBIN, J., M.R.C.S., D.A.: whole-time anæsthetist, Kirkcaldy General Hospital.

WHITESIDE, C. G., B.M. Oxfd, F.F.R., D.M.R.D.: consultant radiologist, The Middlesex Hospital, London.

Birmingham Regional Hospital Board:

ASTLE, W. E. C., M.B. Camb., D.M.R.D.: whole-time consultant radiologist, Stoke-on-Trent group.

LITCHFIELD, J. A., M.B. Birm., M.R.C.P.: part-time consultant physician, Walsall group.

PARKER, R. B., M.B. Edin., M.R.C.O.G.: part-time consultant obstetrician/gynæcologist, Birmingham (mental B) and Walsall groups.

SCRASE, W. H., M.B. Birm., F.R.C.S.E.: part-time consultant orthopædic surgeon, Birmingham R.H.B.

Diary of the Week

MAY 6 TO 12

Monday, 7th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
2 P.M. *Experimental Medicine and Therapeutics.* Dr. W. Davis, Prof. A. Haddow, Dr. G. B. Brown, Dr. Aaron Bendich, Dr. D. A. G. Galton: Antitumour Agents.

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
4 P.M. Dr. Aubrey Leatham: Systolic Murmurs.

Tuesday, 8th

UNIVERSITY OF LONDON
5.30 P.M. (University College, Gower Street, W.C.1.) Dr. S. W. Kuffler (Johns Hopkins University): Factors in the Control of Movement.

ROYAL SOCIETY OF MEDICINE
8 P.M. *Psychiatry.* Dr. J. Pollitt, Dr. J. Pippard: Obsessive Compulsive States.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. H. Haber: Cutaneous Manifestations of Syphilis.

WRIGHT-FLEMING INSTITUTE OF MICROBIOLOGY, St. Mary's Hospital, W.2
5 P.M. Prof. L. Pillemer (Cleveland, Ohio): The Nature of the Properdin System.

ROYAL COLLEGE OF PHYSICIANS, Edinburgh, 2
5.30 P.M. Prof. F. H. Smirk: Treatment of Hypertension. (George Alexander Gibson lecture.)

Wednesday, 9th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
3.45 P.M. Dr. B. E. Heard: Cortisone and Inflammation. (Erasmus Wilson demonstration.)

POSTGRADUATE MEDICAL SCHOOL OF LONDON
2 P.M. Prof. C. F. Barwell: Laboratory Diagnosis of Virus Infections.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. R. W. Riddell: The Rôle of Fungi in Skin Disease.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Mr. Vernon Thompson: Surgical Treatment of Bronchial Carcinoma.

UNIVERSITY OF OXFORD
5 P.M. (Radcliffe Infirmary.) Prof. M. A. van Bouwdijk Bastiaanse (Amsterdam): Toxæmia of Pregnancy. (Litchfield lecture.)

MANCHESTER MEDICAL SOCIETY
4.30 P.M. (University Medical School.) *Pathology.* Dr. A. Holzel, Dr. G. M. Komrower, Mr. V. Schars: Galactosæmia.

ROYAL COLLEGE OF SURGEONS, Edinburgh, 8
3.30 P.M. Prof. C. F. W. Illingworth: Inborn and Extraneous Factors in the Ætiology of Peptic Ulcer.

Thursday, 10th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Mr. C. W. D. Lewis: Melanomas and Melanosis. (Hunterian lecture.)

POSTGRADUATE MEDICAL SCHOOL OF LONDON
4 P.M. Dr. Sheila Sherlock: Portal Hypertension.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. J. O. Oliver: Laboratory Diagnosis of Syphilis.

ALFRED ADLER MEDICAL SOCIETY
8 P.M. (11, Chandos Street, W.1.) Prof. H. Baruk (Charenton): Thirty Years of Research into the Problem of Psychophysiology of the Will.

NUFFIELD ORTHOPÆDIC CENTRE, Oxford
8.30 P.M. Mr. R. G. Taylor: Extra-articular Calcification of Joints Following Trauma. Mr. J. Agerholm: The Zig-zag Osteotomy.

HONYMAN GILLESPIE LECTURE
5 P.M. (University New Buildings, Teviot Place, Edinburgh.) Prof. E. J. Wayne: Clinical Surveys and Clinical Trials.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Queen's College, Small's Wynd, Dundee.) Prof. A. D. Walsh, PH.D.: Chemistry and Cancer.

UNIVERSITY OF DUBLIN
5 P.M. (Trinity College.) Dr. Moacyr E. Alvaro: Ætiology and Pathogeny of Uveitis.

Friday, 11th

POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Prof. B. W. Windeyer: The Reticuloses.
4 P.M. Dr. John Shillingford: Tricuspid Incompetence.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Prof. A. St. G. Huggett: Chronology of the Placenta.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
3.30 P.M. Mr. Kenneth Rotter: Diagnosis of Cancer in the Nose and Nasopharynx.

INSTITUTE OF CHILD HEALTH
5 P.M. (The Hospital for Sick Children, Gt. Ormond Street, W.C.1.) Prof. Robert Debré (Paris): Primary Tuberculosis in the Infant and Child.

UNIVERSITY OF OXFORD
9.15 A.M. (Radcliffe Infirmary.) Prof. C. Bruce Perry: Ætiology and Prophylaxis of Acute Rheumatism.

Notes and News

RESEARCH ON RHEUMATISM

ON Tuesday, with the Duke of Gloucester presiding, the Empire Rheumatism Council received its 19th annual report from Dr. W. S. C. Copeman, who in 1953 succeeded Lord Horder as chairman.

Describing the council as "pre-eminently a research organisation although it in no wise neglects the subjects of teaching and treatment," Dr. Copeman said that its laboratory, at the Hospital of St. John and St. Elizabeth, is being used by Miss H. Muir, D.PHIL., an E.R.C. fellow working mainly on connective-tissue polysaccharides at St. Mary's Hospital. Another E.R.C. fellow, of long standing, is Mr. J. K. Norymberski, D.ING., director of medical research in the Sheffield centre, who is further investigating steroid hormones; and a third, Dr. Madeline Keech, appointed last October, is studying denaturation of collagen and elastin with a view to analysing changes in connective tissue associated with disease. A fund provided by the Geigy Pharmaceutical Company has enabled the council to send Dr. Malcolm Thompson, Dr. J. Sharp, and Dr. J. Ball to work in the U.S.A., and a further Geigy travelling fellowship, for the same purpose, has been given to Dr. E. J. Holborow. The council is supporting steroid research by Dr. J. D. Robertson and Dr. L. Chapman at the West London Hospital, a study of rheumatoid arthritis in two contrasting communities by Dr. E. Wittkower at McGill University, and investigations at Taplow by Mr. H. M. Bassioni, PH.D., on the estimation of heparin-like substances in blood tissues and by Dr. S. C. Milazzo on antigenic substances in reticulin fibres and basement membranes. A number of grants for apparatus have also been made.

Turning to future plans, Dr. Copeman spoke of a unit which is to undertake field research into rheumatic diseases. Though probably based at first on Manchester University, it may eventually make investigations anywhere, including possibly the Dominions. Dr. J. S. Lawrence, the newly appointed medical director, will shortly be visiting other centres here and abroad where field studies of rheumatic diseases are in progress, and in due course a clinical, statistical, and radiological team will be assembled. Dr. E. R. Hargreaves, deputy M.O.H. for Cornwall, has offered to do some additional preliminary survey work in that county, and Dr. G. R. Fearnley's scheme for a parallel survey in Gloucestershire will be included. Another survey conformative with the general one is to be made in Wensleydale by Prof. C. L. Oakley, of Leeds.

The Rheumatoid Arthritis Handbook, prepared by the council for doctors to issue to their patients, has been "an unqualified success," nearly 20,000 copies having been distributed free of charge. An Osteo-arthritis Handbook is now in preparation.

Supplements to this report are Dr. Copeman's account of his official tour in Australia and New Zealand last autumn, and a description of the University of Manchester's rheumatism research centre directed by Prof. J. H. Kellgren, whose chair was established by the council. Also attached is a report from the finance committee expressing thanks but pointing earnestly to the need for new supporters. The council's address is Tavistock House North, Tavistock Square, London, W.C.1.

B.M.S.A. SYMPOSIUM ON MEDICAL EDUCATION

THE British Medical Students' Association has been asked by the General Medical Council for its views on the medical curriculum. An educational subcommittee is now investigating the 1st M.B. course and a report is being prepared. To stimulate greater interest in the subject among students and to further the exchange of views between schools and between teachers and students, the London region of the association held, on April 21 at the London Hospital Medical College, a symposium on medical education. Dr. H. B. May, dean of the London, welcomed the participants, and the chairman, Dr. R. D. Lawrence, of King's, opened the symposium. The first speaker, Dr. John Ellis, described medical education up to 1935 and the developments since that date. Later, students from several London hospitals read papers on various aspects of present-day medical teaching. They all criticised the demands of examiners but most showed that their schools were doing the best that could be done for them under the present system.

Dr. G. O. Barber pleaded for the integration of the profession and asked that students, particularly the future consultants, should learn in their student days the importance of the general practitioner in the care of the community. Prof. Clifford Wilson emphasised that medical education should be a training in method not the acquisition of almost every available fact. He outlined a medical course which seemed much better suited to fulfil this purpose.

In a session on the teaching of specific subjects, Prof. Ruth Bowden showed how, when teaching anatomy, she tried to persuade her students to study the body as a functioning whole, not as dissectable parts. Prof. G. Payling Wright illustrated how the important diseases of one decade may not be the important ones of the next. He thought that a full understanding of pathological processes was more useful than a vast knowledge of present histological appearances.

In his closing remarks, Dr. Lawrence drew attention to the problem continually facing medical students—what *can* they say and what *are* they to say when asked for information by patients? What had impressed him most during the symposium was the amount of thought which student speakers had given to their education and the way in which they had presented their views.

BRITISH ASSOCIATION OF PHYSICAL MEDICINE

AT this society's annual meeting, held in London on April 27 and 28, the following officers were elected: president, Dr. Philippe Bauwens; vice-president, Dr. Hugh Burt; hon. secretary, Dr. G. O. Storey; hon. treasurer, Dr. Donald Wilson; hon. editor, Dr. A. C. Boyle.

At the annual dinner, on April 27, the toast of The Association was proposed by Dr. W. S. Tegner, who remarked that this was the first meeting since the death of Lord Horder, the first president. He forecast that the association would continue to flourish, citing as evidence the quality of the papers presented at the meeting. Sir Harold Boldero replied for The Guests to a toast by Dr. W. A. Fell, who likened the proposer of such a toast to a guide taking visitors round a zoo. But his later remarks made it clear that those present had human interests.

BRITISH STANDARD FOR SPECTACLE LENSES

A NEW standard for spectacle lenses (B.S. 2738) emphasises that "the criterion of success in a pair of spectacles is the comfort of the wearer" and points out that accuracy of lens preparation is essential to this end.

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Copies of this standard (price 3*s*.) can be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1.

University of London

Dr. A. S. Prophet, lecturer in dental surgery in the Queen's University, Belfast, has been appointed to the chair of dental surgery at University College Hospital Medical School.

University of Bristol

On July 3 the hon. degree of D.SC. will be conferred on Prof. J. Z. Young, F.R.S., and the hon. degree of M.D. on Dr. J. H. Sheldon.

University of Glasgow

On April 28 the following degrees were conferred:

M.D.—M. T. D. Braide, J. M. White (with commendation).
Ph.D.—S. C. Frazer.

Royal College of Surgeons of England

On April 23 Sir Winston Churchill visited the college and signed the roll on his formal admission as an honorary fellow.

Royal Society

At the invitation of the Academy of Sciences of the U.S.S.R. this society is sending a delegation to Moscow, under the auspices of the Soviet Relations Committee of the British Council, to visit scientific institutions. Lord Adrian, O.M., the immediate past-president of the society will lead the delegation, and the other medical member is Prof. J. H. Gaddum.

Royal College of Physicians of London

At a comitia held on April 26, with Sir Russell Brain, the president, in the chair, it was announced that the Wellcome Trustees had given £40,000 as an endowment for research into the history of medicine, and £6000 towards the extension of the college building, as well as a grant towards a new edition of the Harvey film in colour which will be made by the Foundation's film unit.

Dr. E. R. Boland, Dr. T. C. Hunt, and Dr. J. B. Harman were reappointed as representatives on the Central Medical Recruitment Committee.

The following were elected to the fellowship:

T. P. REES, Warlingham, Surrey; A. D. PORTER, Dunmow, Essex; J. K. MADDOX, Sydney; SAMUEL BERMAN, Cape Town; H. W. E. JONES, Wolverhampton; J. V. DACIE, London; H. S. DAVIS, London; J. W. GRAHAM, Toronto; T. E. JONES-DAVIES, Carmarthen; S. D. M. COURT, Newcastle upon Tyne; C. R. B. BLACKBURN, Sydney; I. B. SNEDDON, Sheffield; R. I. S. BAYLISS, London; RAYMOND DALEY, London; D. W. PUGH, Bath; R. H. GIRDWOOD, Edinburgh; J. C. HOUSTON, London; GERALD GARMANY, London; J. D. N. NABARRO, London; DERYCK TAVERNER, Leeds; J. E. CATES, Bristol; A. J. S. MCFADZEAN, Hong-Kong; W. S. M. CRAIG, Leeds; G. M. WILSON, Sheffield; S. MONTEIRO, Singapore; H. A. MAGNUS, London; W. P. STAMM, Aylesbury; F. S. COOKSEY, London; I. G. W. HILL, Dundee; Sir DAVID CAMPBELL, Aberdeen; Sir CHARLES HERCUS, Dunedin; C. G. MCDONALD, Sydney.

The following, having satisfied the censors' board, were elected to the membership:

Mohamed El Hassan Abu-Bakr, Diploma Kitchener Sch. of Med., Khartoum, J. S. Bearcroft, M.B.Durb., G. M. Berlyne, M.B. Manc., R. A. Carter, M.B. Camb., T. P. Casey, M.B. N.Z., G. W. Cooper, M.B. Melb., A. C. Crooke, M.D. Camb., James Crooks, M.B. Glasg., M. S. Dunnill, M.B. Brist., J. H. Edwards, M.B. Camb., A. G. Fisher, M.D. Melb., R. H. Fox, M.B. Lond., I. K. Fry, B.M. Oxfd, P. A. L. Horsfall, M.B. Witw'srand, J. P. Hughes, M.B. Lond., R. S. Jones, M.B. Lpool, B. J. Lake, M.B. Sydney, A. L. Latner, M.D. Lpool, Patricia J. Lindop, M.B. Lond., A. V. Livingstone, L.R.C.P., B. L. Mallett, M.B. Lond., S. C. Melnick, M.B. Lond., H. S. Moore, M.B.E., M.B. Lond., captain R.A.M.C., David Mymin, M.B. Witw'srand, Donough O'Brien, M.D. Camb., Elizabeth A. F. Priest, M.B. Aberd., H. M. N. Rees, M.B. Wales, L. Z. Resnekov, M.B. Cape Town, J. G. Richards, M.B. Sydney, G. G. Scott-Brown, M.B. Camb., F. R. T. Stevens, M.D. Melb., J. E. P. Thomas, M.B. Cape Town, H. J. Weston, M.B. N.Z., E. H. Williams, M.B. Camb., L. G. Young, M.B. N.Z., surgeon lieut.-commander R.N.Z.N.

Licences to practise were conferred upon the following 157 candidates who have passed the final examination of the conjoint board:

Peter Adlington, Hilary Allin, Babatunde Oladipo Amure, M. J. Andrews, Solomon Bacchus, Armaity Bamboat, R. T. Barber, J. S. Beales, M. E. J. Beard, J. D. L. Bell, Phyllis J. A. Bell, P. J. Bennison, A. C. S. Bloomer, V. A. W. Blunt, D. J. Bowen, J. F. Brooks, A. G. Bryer, I. F. M. Buchanan, D. R. Burcombe, A. L. Bussey, R. P. Callaghan, D. I. Campbell, J. W. Carter, Joseph Connolly, Neville Conway, P. L. Cook, A. H. Crisp, Nickel Crombie, H. G. Davies, J. E. Davies, J. J. De Jode, G. T. Dunger, A. G. Edwards, S. T. Eng, R. H. Evans, T. G. Evans, D. J. Fairclough, J. O. O. Fajemisin, Parviz Faridian-Aragh, J. W. J. Fearne, D. M. C. Forster, M. J. N. Frohn, Margaret Fuest, D. A. Furniss, J. R. M. Gibson, A. D. R. Goodliffe, Fiona M. Graham, Rodney Grahame, Aubrey Greenbaum, Ajeet-Bans Lall Gulati, Teresa M. Gurrin, C. L. G. Hale, D. M. Harris, P. R. Hawley, R. B. Hayden, Jennifer Hill, J. R. Hobbs, C. V. Horn, E. A. Horniman, Pauline M. Hughes, C. J. B. Hundleby G. M. Hunter, H. E. Inniss-Palmer, G. W. Jenkins, Trefor Jenkins, Jane G. Jenkinson, G. J. Jewell, Pauline M. Jones, W. G. G. L. Jones, W. R. B. Jones, Winifred M. Jones, A. J. Jordan, S. E. Josse, Amirali Kanji, J. J. Kelly, J. M. Kennedy, J. C. Kent, M. G. Kielty, D. G. Law, S. C. Lennox, Patricia E. Linnell, W. A. Lishman, V. St. C. D. Logan, J. N. Lunn, P. D. Marsden, Faith E. Maurice-Williams, Ann P. Melville, C. W. Millar, F. J. C. Millard, R. B. Miller, R. E. Mills, D. A. Montgomery, B. B. Mook-Sang, Janice H. Mount, D. H. Murphy, P. H. Nankivell, M. A. Nelson, John O'Brien-Bell, P. C. Offil, P. F. B. Owen, Hosep Pambakian, Amelia W. H. Parker, G. T. Parker, G. W. Pennington, Hazel M. Phillips, G. E. Pickup, P. W. Pitt, C. J. Powel Smith, D. A. H. Pratt, John Price, Valerie J. Prior, John Quantrill, Kathleen M. Rich, J. D. M. Richards, A. R. Robertson, I. G. Ross, Stanley Rowlands, Mary G. Russell, M. P. Y. Scott, B. S. Smith, D. G. Smith, Jean M. B. Smith, K. G. R. Somer, M. J. Sparrow, Elizabeth A. Spence, P. A. J. Starr, R. E. Steel, G. M. Steiner, Henriette R. P. Sutherland, G. R. Swift, S. W. Tarlton, J. A. Theobald, D. A. Thomas, G. D. Thomas, C. B. Thomson, A. C. Ticehurst, J. E. Tindle, J. W. Turner, W. H. C. Walker, Margaret M. Walshe, Eileen Waring, D. A. Weatherhead, Harry Westbury, C. T. Western, P. E. K. Will, D. O. Williams, D. P. Williams, E. J. Williams, J. G. P. Williams, M. G. Williams, Donald Winstock, T. K. W. Woolacott, Douglas Wright, P. R. Wykes, Barbara K. Zamoyska, Klaus Zobel, J. S. M. Zorab.

The following diplomas and those mentioned in our issue of April 21 (p. 519) were conferred jointly with the Royal College of Surgeons:

D.C.H.—Mary K. M. Lindsay.

D.A.—R. P. Holmes.

D.I.H.—Doreen P. Allan.

D.T.M. & H.—Douglas Buchanan, A. M. Rankin.

Royal College of Obstetricians and Gynæcologists

The following were successful in a recent examination for the diploma in obstetrics:

R. M. Adam, M. D. Adams, Colina C. Adeniyi-Jones, W. J. K. Aitchison, Patricia M. Alexander, L. J. H. Arthur, J. F. P. Asbury, Mehroo Dinshah Aziz, P. B. Bailey, Jean L. Baker, Patricia Baker, Jacqueline E. Banbury, J. G. Banton, R. C. Begg, P. J. Bell, Geoffrey Berry, J. R. Birkett, D. B. Bower, Patricia M. Boyd, James Bradshaw, Cynthia A. R. Bray, R. A. Briggs, Gordon Brill, J. A. Browne, C. J. Buckingham, H. M. Buckland, M. J. V. Bull, R. A. Butler, D. S. Carroll, Robert Chalmers, G. V. P. Chamberlain, Elizabeth P. Cloake, J. B. Coldrey, J. A. Collings-Wells, Diana J. Collins, L. J. Conway, M. B. S. Cooper, Anne M. Cormack, M. L. Cox, G. R. Cubitt, Maria W. Dabrowska, I. R. Dalton, Alice L. Davis, L. R. Dennis, A. E. L. de Thierry, R. T. Donald, G. D. Downes, R. G. Dryden, G. T. Dunger, Robert Edmond . P. English, J. A. L. F. Espitalier-Noel, R. S. K. Essame, Hilary . Evans, J. L. Evans, Andrew Fairley, J. K. Fanning, M. V. J. . gerald, D. L. Flax, Sheila M. Forbes, W. T. Frame, R. T. Gau. oger, William Gault, R. H. S. Gibbs, J. R. Gillespie, P. R. Gittins, G. T. Goodey, H. M. Gough, Rosemary A. Grange, Peter Greaves, Ruth J. Grose, Irene C. Hain, E. B. D. Hamilton, I. G. Hamilton, J. M. G. Harley, W. B. Hepburn, Fred Hewitt, I. A. Hill, C. P. Hindley, A. H. T. Hodgkinson, Joyce Honey, T. J. G. Howie, T. O. Hughes, A. B. Hugo, J. G. P. Hunt, Elizabeth M. Innes, Edna M. Irwin, P. D. C. Jarman, Wendy J. Jefferson, Ruth W. Joelson, W. M. Jordan, M. A. Kalina, Terence Kavanagh, G. B. Kelly, Lilias Kilpatrick, J. W. Kirkbride, D. A. Lamont, P. F. P. Lansdown, W. G. R. M. Laurie, Ann B. Lewin, E. S. Linton, W. C. Logan, Helen D. Macfarlane, E. J. Mackay, Tormod Macleod, W. I. Martin, Gillian G. Matthews, John McIntosh, J. T. McLeod, D. C. S. Millar, J. F. Moor, Alan Moore, Kamalini Narayan, J. G. Nicholson, G. K. Nixon, Sheelagh M. O'Grady, P. J. Olney, A. M. Orcharton, L. W. Padgett, Joyce E. Page, R. B. Pardoe, D. W. Paterson, Iris O. Peachey, P. L. Pelmear, Gordon Penny, Ruth E. E. Pocock, P. A. P. Pompa, W. St. M. Prendiville, M. G. Price, W. W. Ramsay, H. W. S. Rankin, M. J. Ree, J. A. Reynolds, A. D. Richardson, J. G. Rigby, J. B. Ross, C. A. Rushmer, Attiya Sabir, A. H. Saddler, Lino Sammut, R. K. M. Sanders, J. G. Sanderson, I. P. Q. Scott, E. J. Sheppard, Beryl M. Shipton, E. M. Shuttleworth, D. L. Sladden, J. J. Slome, A. M. Smith, Alison Smithies, Ismat Ibrahim Snobar, Brijendra Kumar Sood, E. J. Stacey, Betty Standeven, T. D. Seigne, Owen Thomas, Ma Ma Tin, A. J. Tulloch, D. E. Tunnadine, L. P. D. Tunnadine, J. C. S. Turner, G. R. Veitch, Elizabeth H. M. Walker, M. R. B. Wallice, Mahinder Chand Watsa, P. A. Watt, Joyce D. Waye, James Weatherup, Joy E. West, D. C. Williamson, James Wilson, P. M. Wine, H. J. Wood, R. F. Wright.

Royal Medical Benevolent Fund

The annual general meeting of this Fund is to be held on Tuesday, June 5, at 5 P.M., at 11, Chandos Street, London, W.1.

Institute of Dermatology

A semi-permanent exhibition by Dr. I. Friedmann on diseases of the nose and ear in relation to dermatology will be held at the Institute, Lisle Street, W.C.2, from May 7 to 25.

Heroin Banned in Italy

By a decree, entered in the official gazette of the Italian government (March 24, 1956), the manufacture and importation of heroin has been prohibited in Italy.

Royal Society of Arts

On Mondays, May 7, 14, and 28 at 6 P.M., at the society's house, John Adam Street, London, W.C.2, three Cantor lectures will be given on Recent Studies of Sociology. On May 7, Prof. T. S. Simey, M.A., will speak on Class Conflict and Social Mobility. On May 14, Prof. D. V. Glass, PH.D., will speak on the Development of Demography. The last lecture will be given on May 28 by Dr. R. F. Tredgold, whose subject will be Changes in Social Responsibilities.

Industrial Medicine Unit

The North West Metropolitan Regional Hospital Board have agreed that an industrial medicine unit shall be set up at the Central Middlesex Hospital. It is proposed to appoint a consultant physician who will have beds at the hospital and will study the prevention of "conditions in factories which contribute to the hospital load in the casualty and out-patient departments as well as the wards." The Nuffield Trust will meet the cost of the unit for the first three years.

Settlement of Dispute in Malta

In Malta the dispute between the government and the Medical Officers' Union (see *Lancet*, April 21, 1956, p. 519) has been settled (*Times*, April 26, 1956). Doctors, after withdrawing their letters of resignation, are to be reinstated. A commission, comprising a legal chairman and two members nominated by the Royal College of Physicians and the Royal College of Surgeons, will be appointed to review the medical service and the terms of employment. Meanwhile no action will be taken to fill posts in Gozo or similar posts.

The honorary fellowship of the American College of Physicians has been conferred on Dr. Macdonald Critchley.

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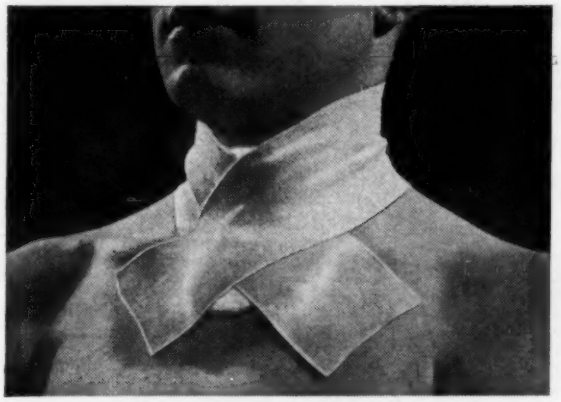

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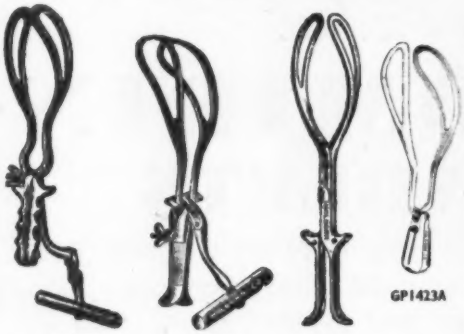

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This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods; insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombières treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-ray Room, an Ultraviolet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for biochemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

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Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: Northampton 4354 (3 lines)), who can be seen in London by appointment.

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and the
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Notice is hereby given that the following Examinations will commence on the dates stated below :—

DIPLOMA IN LARYNGOLOGY AND OTOLOGY
DIPLOMA IN PSYCHOLOGICAL MEDICINE
7th June
CERTIFICATE AND DIPLOMA IN PUBLIC HEALTH
14th June
DIPLOMA IN MEDICAL RADIO-DIAGNOSIS
Part I—21st June

Applications and fees for either or both Parts of an Examination must reach the Secretary, Examination Hall, Queen-square, London, W.C.1, at least 21 days before Part I of the Examination begins. FRANCIS M. STENT, Secretary.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

FRANCIS THOMAS GARNET PRUNTY, Esq., M.D., F.R.C.P., will deliver the HUMPHRY DAVY ROLLESTON LECTURES on TUESDAY, 15TH and THURSDAY, 17TH MAY, 1956, at 5 P.M., at the College, Pall Mall East, S.W.1.

Subject : "Chemical and Clinical Problems of the Adrenal Cortex."

Any member of the Medical Profession admitted on presentation of card. By order of the President.
HAROLD BOLDERO, Registrar.

UNIVERSITY OF LONDON

POSTGRADUATE MEDICAL SCHOOL OF LONDON

The Department of Anæsthesia offers a COURSE OF INSTRUCTION for the academic year beginning 2ND OCTOBER, 1956, to a limited number of postgraduate students wishing to specialise in anæsthesia.

A comprehensive teaching programme has been established and the subjects covered include anatomy, pathology, pharmacology and physiology.

In addition to systematic lectures in anæsthesia, medicine and surgery, clinical training is provided in the wards and operating theatres and special provision is made for the demonstration of techniques not in common use.

The fee for the course is £75, plus £3 enrolment fee.

Further particulars may be obtained from the Dean, Postgraduate Medical School of London, Ducane-road, London, W.12.

UNIVERSITY OF MANCHESTER

FACULTY OF MEDICINE

DIPLOMA IN PUBLIC HEALTH

A PART-TIME COURSE covering 2 academic years will commence in OCTOBER, 1956. Candidates are required to obtain posts in the Manchester region from which they are permitted to attend the University for the equivalent of 2½ days each week for 6 terms. Every assistance is given to prospective candidates to obtain suitable employment.

Application forms may be obtained from the Dean of Postgraduate Medical Study, University of Manchester, Manchester, 13, or from Prof. C. F. BROCKINGTON, Department of Social and Preventive Medicine, Clinical Sciences Building, Yorkplace, Manchester, 13.

THE UNIVERSITY OF MANCHESTER

SYBIL MARY PILKINGTON FELLOWSHIP
FOR RESEARCH INTO DISEASES OF THE BLOOD

Applications are invited for the Sybil Mary Pilkington Fellowship for research into Diseases of the Blood, with particular reference to the causation, treatment and cure of leukæmia in man. The Fellowship is open to persons who have obtained a medical qualification registrable in the United Kingdom, the Dominions or any other country. It is of the normal value of £700 p.a. and is tenable for 1 year in the first instance, but may be renewed for a second or subsequent years.

Applications must be sent not later than 1st June, 1956, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

THE UNIVERSITY OF BIRMINGHAM

FACULTY OF MEDICINE

WILLIAM WITHERING LECTURES, 1956

Prof. P. B. MEDAWAR, M.A., D.SC., F.R.S. (Jodrell Professor of Zoology and Comparative Anatomy, University College, London) will deliver the William Withering Lectures in the large Anatomy Theatre of the Medical School on MONDAY, TUESDAY and WEDNESDAY, 14TH, 15TH and 16TH MAY, 1956, at 4 P.M. each day.

Subject : "Transplantation and Immunology."

Members of the medical profession and students of medicine are invited to attend. A. P. THOMSON, Dean.

PADDINGTON GROUP HOSPITAL MANAGEMENT COMMITTEE

TAVISTOCK CLINIC

ELEMENTARY PSYCHOTHERAPY COURSE

The Adult Department of the Tavistock Clinic announces a 2-year course in the elements of psychotherapy, psychopathology and therapeutic group experience, for psychiatric trainees and specialists. Up to 8 students will be admitted at the discretion of the Training Committee.

The Course requires attendance on 1 late afternoon and evening per week in term-time, and will begin early in OCTOBER, 1956.

Applications by 13th July to the Medical Director (Training), Tavistock Clinic, 2, Beaumont-street, W.1, from whom further particulars may be obtained.

UNIVERSITY OF GLASGOW

SESSION 1956–57
DIPLOMA IN PUBLIC HEALTH

A COURSE OF INSTRUCTION covering 3 Academic terms will commence in OCTOBER, 1956.

The fee for the full course is £36 4s. 6d.

Application forms may be obtained from the Dean of the Faculty of Medicine, The University, Glasgow, and should be lodged not later than 30th June, 1956.

MARLBOROUGH DAY HOSPITAL

38, Marlborough-place, N.W.8

Medical practitioners and professional people working in the mental health field are cordially invited to LECTURES held at the above Hospital on the first Monday of every month at 8.15 P.M.

ON MONDAY, 7th MAY, 1956, Prof. AGREGE H. BARUK of Paris (Medical Director of Maison Nationale De Sante) will be speaking on :—

"Thirty years of Research on the psycho-physiological problem of volition."

THE ADOLPH BASSER FELLOWSHIP IN RESEARCH

OF THE ROYAL AUSTRALASIAN COLLEGE OF PHYSICIANS

Applications are invited for the above Fellowship from research workers in any branch of scientific medicine. The appointment will be for 5 years with a possible renewal for a further term. The salary will be £3750 (Aust.) p.a., and arrangements will be made for superannuation. An additional grant will be made for technical help and equipment. The research must be carried out in Australia or New Zealand. There are no routine teaching duties associated with the appointment.

Detailed information about the conditions of award may be obtained from the Hon. Secretary, The Royal Australasian College of Physicians, 145, Macquarie-street, Sydney. Applications will close on 31st July, 1956.

TANCRED'S STUDENTSHIPS

DIVINITY : MEDICINE : LAW
£100 p.a. each. For Men only

The Governors and Trustees of Tancred's Foundation propose to make their annual election of a Student in Physic at Gonville and Caius College, Cambridge, on the result of the Entrance Examination to be held in JANUARY, 1957, required from candidates for admission to Gonville and Caius College, Cambridge, who intend to read medicine.

Candidates must have been born in England, Scotland or Wales and be members of the Church of England and unmarried. Candidates must be within the ages of 17 years and 22 years on 1st October, 1957. The last day for sending in Petitions is 1st July, 1956.

Further announcements relating to the Divinity and Law Studentships awarded by this Foundation will appear in September, 1956, and February, 1957.

Apply for further particulars and form of Petition stating kind of Studentship and mentioning this paper to the Clerk, R. M. C. HOWARD, Esq., D.S.O., 28, Lincoln's Inn-fields, London, W.C.2.

THE ROYAL SOCIETY

SCIENTIFIC PUBLICATIONS GRANTS

Applications for grants from the first allotment of the Government Grant for Scientific Publications for the year 1956 should be made as soon as possible. No application can be considered which is received later than 15TH JUNE, 1956. This grant is provided for the assistance of scientific publications in the United Kingdom, particularly but not exclusively those of scientific societies and institutions of a national character. A small part of the grant is available for the assistance of the libraries of scientific societies. Applications are receivable only from societies and institutions in the United Kingdom and individuals of British nationality.

Applications will be considered at the same time for grants from funds made available by the Wellcome Trust for the support of publications dealing with research in the field of medical and allied science.

Forms of application may be obtained from the Assistant Secretary, The Royal Society, Burlington House, London, W.1.

UNIVERSITY OF BRISTOL. Applications are invited for the appointment of LECTURER AND HEAD of the Department of Anæsthetics in the University, tenable in the United Bristol Hospitals. Salary within the scale for Clinical Lecturers, together with superannuation and children's allowances. The successful candidate will be granted an honorary contract as Consultant with the Board of Governors of the United Bristol Hospitals.

Applications (20 copies), stating age, qualifications and experience and including the names of 3 referees, should reach the undersigned, from whom further particulars may be obtained, not later than 22nd May, 1956.
H. C. BUTTERFIELD, Registrar and Secretary.

UNIVERSITY OF EDINBURGH. Department of Medicine. Applications are invited for the appointment of a SENIOR LECTURER IN NEUROLOGY in the Department of Medicine. The successful applicant will be given an honorary appointment as a Consultant by the South-Eastern Regional Hospital Board, Scotland, with charge of the Medical Neurological Unit at the Northern General Hospital and with duties as an Assistant Associate Physician to the Medical Neurologist at the Royal Infirmary. Salary will be on the scale £2250–£100–£2750 p.a., with placement according to qualifications and experience, and with superannuation benefit and family allowance where applicable.

Further particulars may be obtained from the undersigned, with whom applications, giving the names of 2 referees, should be lodged not later than 6th June, 1956.
JOHN MACPHERSON, Assistant Secretary to the University.

UNIVERSITY OF LONDON. The Senate invite applications for the READERSHIP IN CONSERVATIVE DENTISTRY tenable at Royal Dental Hospital of London School of Dental Surgery (salary within range £1900–£2400 a year).

Applications (10 copies) must be received not later than 7th June, 1956, by the Academic Registrar, University of London, Senate House, W.C.1, from whom further particulars may be obtained.

GUY'S HOSPITAL MEDICAL SCHOOL. Applications are invited for the following posts in the Anatomy Department at Guy's Hospital Medical School :—

3 JUNIOR LECTURERS (whole-time).
1 JUNIOR LECTURER (part-time).

The salary scale is £700, rising by annual increments of £50 to £900, with superannuation and family allowances. The appointment will be for 1 year from 1st October, 1956, but the holder will be eligible for reappointment.

Forms of application and further particulars are obtainable from the Dean, Guy's Hospital Medical School, to whom the forms of application should be forwarded not later than 24th May, 1956.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, S.W.1. Applications are invited for the post of SENIOR LECTURER IN SURGERY in the Surgical Unit about to be established at St. George's Hospital, Hyde Park Corner. Salary according to the University scale for clinical teachers : F.S.S.U. and family allowances benefits. Duties to begin on or about 1st October next. The successful candidate would be eligible for appointment as an Honorary Consultant to St. George's Hospital, while holding this post.

Applications, with names of 3 referees, should reach the Dean of the Medical School not later than 1st June, 1956.

THE MEDICAL COLLEGE OF ST. BARTHOLOMEW'S HOSPITAL, West Smithfield, E.C.1. Applications are invited from medically qualified graduates for the post of JUNIOR LECTURER IN PHARMACOLOGY, tenable as from 1st July, 1956, or as soon as possible thereafter. The salary is on a scale of £700–£50–£900 p.a. together with family allowance and membership of the F.S.S.U. The successful candidate will undertake teaching of medical students and will be expected to participate in a research project in clinical pharmacology.

Applications, which should be received not later than 31st May, 1956, should be addressed to the Dean of the Medical College, from whom further particulars may be obtained.

UNIVERSITY COLLEGE OF THE WEST INDIES. Applications are invited for LECTURESHIPIN PHYSIOLOGY. Duties, to be assumed by 1st October, 1956, include lecturing in physiology, demonstrating in experimental, human, and animal physiology and assistance in practical courses of experimental pharmacology to students working for medical degrees of University of London. Salary scale : £1000–£100–£1300–£100–£1700 p.a. Point of entry determined by qualifications and experience. Child allowance. F.S.S.U. Unfurnished accommodation, if available, at rental of 5% basic salary, or allowance in lieu. Passages paid for up to 5 persons on appointment, normal termination and study leave (once every 3 years).

Detailed applications (10 copies), naming 3 referees, to be received by 4th June, 1956, by Secretary, Senate Committee on Colleges Overseas in Special Relation, University of London, Senate House, London, W.C.1, from whom further particulars may be obtained.

UNIVERSITY COLLEGE, Ibadan, Nigeria. Applications are invited for the following posts in Faculty of Medicine :—

Department of Medicine
SENIOR LECTURER.
2 LECTURERS.

Department of Clinical Biochemistry
LECTURER

Department of Pathology
LECTURER IN HÆMATOLOGY.

Department of Bacteriology
SENIOR LECTURER or LECTURER IN BACTERIOLOGY.
LECTURER IN PARASITOLOGY.

Initial appointments 3 years from October, 1956. Present salary scales : Senior Lecturer £1750–£100–£2250 ; Lecturer £1500–£100–£2000 p.a. Allowance for up to 3 children £50 p.a. per child resident in Nigeria, £100 p.a. per child resident elsewhere. Part furnished accommodation at rent up to 7.7% of salary. Passages paid for member of staff, wife, and up to 3 children below age of 11 on appointment, overseas leave and termination. F.S.S.U. Outfit allowance £60.

Detailed applications (10 copies), naming 3 referees, should be received by 11th June, 1956, by Secretary, Senate Committee on Colleges Overseas in Special Relation, University of London, Senate House, London, W.C.1, from whom further particulars may be obtained.

ROYAL NORTHERN HOSPITAL, London, N.7. Centenary Celebrations will take place during the week 25th–30th June, comprising medical films and static demonstrations throughout the week. There will be a demonstration of patients and operations on the day of the Centenary Dinner. The Dinner will take place at the Royal College of Surgeons on Tuesday, 26th June, at 7.30 P.M. for 8 P.M. The Duke of Gloucester has graciously consented to be present.

All Royal Northern Consultant and junior medical staff, past and present, are cordially invited to be present. Further information can be obtained from the Hospital Secretary.

Hospital Services : Senior Appointments

MIDDLESEX HOSPITAL, W.1. Applications invited for post of Full-time ASSISTANT in the Department of X-ray Diagnosis with salary on the scale £1400–£1950.

Applications, naming 2 referees, should be sent to the Deputy Superintendent by 31st May.

MOORFIELDS, WESTMINSTER AND CENTRAL EYE HOSPITAL. Applications are invited for the appointment of 3 Part-time CONSULTANTS to the Hospital, each to attend for 3 sessions each week—2 outpatient and 1 operating. Candidates must be Fellows of the Royal College of Surgeons of England. The appointments will be subject to the terms and conditions of service of hospital medical and dental staffs (England and Wales), and the provisions of the National Health Service (Superannuation) Regulations, 1947–49.

Applications, stating age, qualifications and details of experience, together with the names of 3 referees, should reach the undersigned not later than 21st May, 1956. 35 copies will be required. Canvassing of members of the Board or the Advisory Appointments Committee is not permitted.

A. J. M. TARRANT, House Governor.
Moorfields, Westminster and Central Eye Hospital,
City-road, London, E.C.1.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

Part-time CONSULTANT SURGEON to Woodford Jubilee Hospital, Woodford Green, Essex. 2 sessions a week.

Part-time CONSULTANT SURGEON, with special interest in urology, to the German Hospital, Dalston-lane, E.8. 4 sessions a week.

Part-time ASSISTANT OPHTHALMOLOGIST(S) (Senior Hospital Medical Officer grade) to Clinics at :

Hackney Wick School Treatment Centre, E.9—1 session a week and 1 session a fortnight.
Hoxton School Treatment Centre, N.1—1 session a week and 1 session a fortnight.
Old Ford School Treatment Centre, E.3—2 sessions a week.
Ida Samuel School Treatment Centre, E.1—2 sessions a week.

Applications (6 copies), and names of 3 referees, should reach the Secretary, 11A, Portland-place, London, W.1, by Saturday, 19th May, 1956.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) ASSISTANT PSYCHIATRIST (whole-time), Senior Hospital Medical Officer grade, Cell Barnes Hospital, St. Albans (676 Beds—Mental Deficiency). Duties will include those of Deputy Medical Superintendent. Hospital may be visited by direct appointment.

Applications before 4th June, 1956.

(2) OPHTHALMOLOGIST (Senior Hospital Medical Officer grade), Nottingdale School Treatment Centre, 1, Kenley-street, W.11. Duties involve 4 hours a week clinical time in 2 visits, Tuesday afternoons and Friday mornings. Clinic may be visited by arrangement with the Divisional Medical Officer, 129, Fulham Palace-road, W.6.

Applications before 11th June, 1956.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for appointment as Part-time CONSULTANT in Physical Medicine to undertake 2 notional half-days a week in the Woolwich Group of hospitals, for duties at St. Nicholas Hospital, Tewson-road, S.E.18. Candidates should have had considerable experience in the specialty. A higher qualification in medicine is essential and the appropriate diploma is desirable. Applicants may visit the Hospital concerned.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 26th May, 1956.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade), (2 half-days per week) at Wimbledon Hospital, S.W.20. The work will be adult outpatient psychotherapy, in which candidates should have thorough training and experience. The sessions will be evening ones.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 2nd June, 1956. Applicants may visit Hospital by local arrangement.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

Birmingham (Sanatoria) Group

Whole-time ASSISTANT CHEST PHYSICIAN (£1500–£1950 p.a.). Duties at : Romsley Hill Hospital, Halesowen, Birmingham (133 Beds) ; Special Diabetic Unit (25 Beds) ; Birmingham Chest Clinic (4 notional half-days) ; Asthma Clinic for School Children (1 notional half-day). Resident single accommodation only.

Dudley Road Hospital, Birmingham (780 Beds)

Whole-time CONSULTANT E.N.T. SURGEON. Duties also at Birmingham Hearing Aid Clinic (1 notional half-day) and Sutton Coldfield Hospital (1 notional half-day). Non-resident. Higher qualification/wide experience specialty essential.

Applications (15 copies), naming 3 referees, to Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, by 21st May. Candidates may visit hospitals.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the post of Locum ASSISTANT ORTHOPÆDIC SURGEON (full-time), Senior Hospital Medical Officer grade. The post is available from 22nd to 26th May, 1956, inclusive, and it is desired to negotiate for a further locum period of 2–3 weeks in the summer if possible.

Applications, stating age, qualifications and experience, with 2 recent testimonials, should reach the Physician-Superintendent of the Hospital as soon as possible.

CHELMSFORD, ESSEX. BROOMFIELD HOSPITAL. Required experienced Locum Tenens SENIOR HOSPITAL MEDICAL OFFICER (part resident). Unit has 330 Beds for the treatment of pulmonary tuberculosis in adults. Tuberculous and non-tuberculous thoracic surgery. Chest clinics and mass radiography.

Apply Physician-Superintendent.

LEEDS REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer scale) for duties at Menston Hospital, near Leeds, and associated clinics at Bradford, Leeds and Keighley. Applicants should hold the D.P.M. or other equivalent qualifications. Resident or non-resident; accommodation is available for a single person.

Applications (12 copies), stating age, qualifications, and details of appointments held showing dates, with names and addresses of 3 referees, to Secretary, Park-parade, Harrogate, by 2nd June, 1956.

LIVERPOOL REGIONAL HOSPITAL BOARD. North WIRRAL AND BIRKENHEAD. Applications are invited for the post of CONSULTANT PHYSICIAN to be in charge of the geriatric units to be developed at St. Catherine's Hospital, Birkenhead, and Mill Lane Hospital, Wallasey. 6 sessions at Birkenhead and 3 sessions at Wallasey will be available. Applicants should have a higher qualification in medicine, and should have had considerable previous experience in geriatrics.

Forms of application from, and to be returned to, Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be received not later than 26th May, 1956.

VINCENT COLLINGE, Secretary to the Board.

MANCHESTER REGIONAL HOSPITAL BOARD.

(*a*) Whole-time or maximum Part-time CONSULTANT RADIOLOGIST to the Ashton, Hyde and Glossop Group of hospitals (mainly Ashton-under-Lyne General Hospital, near Manchester (677 Beds), &c.). Wide experience and higher qualifications essential, appointee to reside in area. 16th May, 1956.

(*b*) Part-time (8 half-days weekly) CONSULTANT PSYCHIATRIST to Parkside Hospital, Macclesfield (1500 Beds), and the Mid and South Cheshire Hospital Centres, outpatient clinics at Crewe and Northwich. Wide experience and higher qualifications essential; appointee to live in area. 22nd May, 1956.

(*c*) Additional Part-time (8 half-days weekly) post of CONSULTANT NEUROSURGEON to the Salford Unit (Salford Royal Hospital and Royal Manchester Children's Hospital) with limited peripheral duties. Wide experience and higher qualifications essential; appointee to live near main hospitals. 23rd May, 1956.

(*d*) Whole-time NON-RESIDENT ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer) to the North Manchester Hospitals (Ancoats, Manchester Victoria Memorial Jewish, Manchester Northern and Crumpsall Hospitals) and at Booth Hall (Children's) and Monsall Hospitals and Prestwich (Mental) Hospital. Successful candidate will work under general guidance of Consultants in wide range of radiological investigations, including specialised paediatrics, neurosurgical and cardiological. Wide experience of diagnostic radiology and D.M.R.D. essential. 17th May, 1956.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by dates stated.

MANCHESTER. UNITED MANCHESTER HOSPITALS. Applications are invited for the post of CONSULTANT ORTHOPÆDIC SURGEON, to commence as soon as possible, for 1 session a week, at the Manchester Foot Hospital. Candidates must possess a higher qualification in surgery.

Applications (12 copies), together with the names of 3 referees, should be sent to the undersigned not later than 26th May, 1956. F. J. CABLE, Secretary to the Board of Governors.

United Manchester Hospitals, Manchester, 13.

NEWCASTLE REGIONAL HOSPITAL BOARD. Cherry KNOWLE HOSPITAL, RYHOPE, near SUNDERLAND. (863 Beds.) CONSULTANT PSYCHIATRIST (whole-time). The Hospital serves the County Boroughs of Sunderland, South Shields and a small part of the County of Durham (population 330,107). Applicants must have had wide experience in psychiatry and be competent to take clinical responsibility, subject to the general administrative control of the Medical Superintendent, of a section of the Hospital and to participate in the work of the associated outpatient clinics, &c. The successful candidate will be required to reside in close proximity to the Hospital. Further particulars from Regional Psychiatrist.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

OXFORD REGIONAL HOSPITAL BOARD. Consultant OPHTHALMIC SURGEON (part-time) for 5 sessions a week, to Aylesbury and High Wycombe area. Duties mainly at Royal Buckinghamshire Hospital, Aylesbury, with peripheral clinics in other parts of the county. The successful candidate will be required to live within a reasonable distance of Aylesbury to undertake his share of emergency duty.

Applications (10 copies), stating age, qualifications, experience, and the names of 3 referees, should reach the Secretary, 43, Banbury-road, Oxford, by 11th June, 1956.

OXFORD. THE UNITED OXFORD HOSPITALS. Applications are invited for the post of Part-time CONSULTANT PHYSICIAN in the Nuffield Department of Clinical Medicine. The appointment will be on a basis of 5 sessions in the United Oxford Hospitals. In addition the Nuffield Committee will undertake to provide academic work to bring the total salary up to the equivalent of 9 sessions in the National Health Service.

Applications, with full particulars of qualifications and experience, and the names of 2 referees, to be sent to the Administrator, Radcliffe Infirmary, Oxford, to arrive not later than 19th May, 1956.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time appointment of SENIOR HOSPITAL MEDICAL OFFICER in Obstetrics at the Lewis Hospital, Stornoway. The salary scale is £1500–£50–£1950 p.a. A house is available to rent.

Application forms and further details are obtainable from the undersigned, to whom applications should be sent by 23rd May, 1956.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments:

Whole-time GROUP PHYSICIAN-SUPERINTENDENT (Consultant grading) to Lennox Castle, Waverley Park, and Caldwell House Institutions, near Glasgow. A house will be available.

Whole-time ASSISTANT PSYCHIATRIST AND DEPUTY PHYSICIAN-SUPERINTENDENT, Glengall Mental Hospital, Ayr. House available. Salary (at age 32 and over) on the scale £1500–£50–£1950.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SOUTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD. Applications are invited to fill a vacancy for a Whole-time ASSISTANT PHYSICIAN for the Geriatric Services and Long-stay Sick in the Canterbury, Isle of Thanet and South East Kent Groups of hospitals. Salary within the scale £1500–£50–£1950.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 26th May, 1956.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires Whole-time CONSULTANT PSYCHIATRIST at Graylingwell Hospital, Chichester, Sussex. Candidates should possess D.P.M. and a higher medical qualification, and have wide experience in all branches of psychiatry. The post is non-resident.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 2nd June, 1956. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires Whole-time PHYSICIAN-SUPERINTENDENT AND CONSULTANT PSYCHIATRIST at St. Ebba's Hospital, Epsom, which is principally concerned with the treatment of voluntary cases of good prognosis and has over 1200 admissions annually. Full facilities for psychological and physical investigations, and all modern treatments used. The Hospital has Outpatient Departments and a special unit for juvenile psychiatric cases. There are teaching linkages with 2 London training hospitals, and the appointment involves psychiatric teaching to medical students. A house (for which a rent will be charged) is available in the grounds if desired. Candidates should possess D.P.M. and a higher medical qualification and have wide experience in all branches of psychiatry and a knowledge of medical administration.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 2nd June, 1956. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires Whole-time PHYSICIAN-SUPERINTENDENT AND CONSULTANT PSYCHIATRIST at Tatchbury Mount M.D. Hospital, Totton, Southampton, where considerable development is taking place. Candidates should possess D.P.M. and preferably a higher medical qualification, and should have wide experience in psychiatry and a knowledge of medical administration. Successful candidate will be required to reside in Loperwood Lodge, Totton.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 2nd June, 1956. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires a Locum Tenens ANÆSTHETIST (8 sessions weekly) for the Isle of Wight Group of hospitals, from 23rd May to 9th June, inclusive. Remuneration in accordance with the terms and conditions of service of hospital medical staff.

Applications, stating age, qualifications, experience and the names and addresses of 2 referees, to the Area Secretary, Highcroft, Romsey-road, Winchester, by 14th May, 1956.

NORTHERN IRELAND HOSPITALS AUTHORITY invite applications for a post as CONSULTANT OPHTHALMIC SURGEON with headquarters at the Benn Hospital, Belfast. The appointment will be on a part-time basis of 9 half-days of duty weekly and the terms and conditions will be in accordance with the Authority's application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be received not later than 19th May, 1956.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT ORTHOPÆDIC AND TRAUMATIC SURGEON required, Caernarvon and Anglesey area, 11th August–1st September, 1956.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

NEW ZEALAND. TAUMARUNUI HOSPITAL BOARD. Applications are invited from medical practitioners with qualifications registrable in New Zealand, for the position of Full-time PHYSICIAN to take full charge of medical patients admitted to the Taumarunui Public Hospital. Applicants should be eligible to qualify as a Junior Specialist under the Hospital Employment (Medical Officers) Regulations, 1952. A higher medical qualification is desirable. Salary scale £1290–£1590 plus cost-of-living bonus, the commencing salary in that scale to be determined by the Medical Officers Salaries Grading Committee. Full particulars of the duties of the position and the conditions of appointment are available on request, or from the office of the High Commissioner for New Zealand, Strand, London.

Applications, showing full particulars of qualifications, and experience, together with the names of 3 referees, should be forwarded to reach the Official Secretary, the Office of the High Commissioner for New Zealand, Strand, London, W.C.2, not later than 30th June. Envelopes should be marked "Physician, Taumarunui Hospital" in the top left-hand corner.

S. A. PHILIP, Secretary.

Hospital Services : Junior Appointments

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. HOUSE SURGEON/CASUALTY OFFICER (combined post), resident, vacant 20th May, 1956. House Officer grade, not pre-registration. Not recognised for F.R.C.S.

Apply Hospital Secretary, enclosing copies of 2 recent testimonials.

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, London, E.2. (General—309 Beds.) HOUSE SURGEON required. Post recognised for pre-registration purposes.

Applications, stating age, experience, qualifications and copies of 2 testimonials, to Hospital Secretary by 12th May, 1956.

CHARING CROSS HOSPITAL, W.C.2. Full-time Senior REGISTRAR in Anæsthesia, non-resident except on every third week-end. Tenable from 1st July, 1956, for 1 year in the first instance. Candidates should hold the Diploma in Anæsthetics and preferably the F.F.A.R.C.S.

Applications, on forms obtainable from the undersigned, should be returned by 21st May, 1956.

A. M. BARKER, Deputy Secretary to the Board.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) 2 HOUSE SURGEONS required for 6 months (General Surgery and Special Departments). Posts vacant 18th and 31st May, 1956. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of HOUSE PHYSICIAN for medicine and pædiatrics, to become vacant 1st July, 1956. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 16th May, 1956.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of SECOND HOUSE SURGEON. Appointment for 6 months from 1st July, 1956. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 16th May, 1956.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of OBSTETRIC HOUSE SURGEON (recognised for the M.R.C.O.G.). Duties to commence 1st July, 1956. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 16th May, 1956.

GERMAN HOSPITAL, London, E.8. (General—157 Beds.) Applications for 6 months appointment of registered HOUSE PHYSICIAN (resident). Post now vacant.

Applications to Group Secretary, Hackney Hospital, E.9, quoting GH/HP.

GUY'S HOSPITAL AND SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill an established vacancy as SENIOR REGISTRAR in Venereology to the Board of Governors of Guy's Hospital and the South East Metropolitan Regional Hospital Board. The holder will be expected to divide his time between the 2 hospitals concerned during a 4-year tenure of the post. The appointment will be made jointly by the bodies concerned and will be held at Guy's Hospital and in the Regional Hospital in the Seamen's Group. The post, which will be reviewed annually, is subject to the terms and conditions of service of hospital medical and dental staffs (England and Wales) with duties commencing on a date to be arranged.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 24th May.

GUY'S HOSPITAL AND SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill the following established vacancies for SENIOR REGISTRARS to the Board of Governors of Guy's Hospital and the South East Metropolitan Regional Hospital Board. They will be expected to spend a minimum of 1 and not more than 2 years in a Regional Board Hospital, in the Group as stated, on an exchange basis during a 4-year tenure of the post. The appointments will be made jointly by the bodies concerned and will be held in the first instance at Guy's Hospital. The posts, which will be reviewed annually, are subject to the terms and conditions of service of hospital medical and dental staffs (England and Wales), with duties commencing on 1st October, 1956.

General Medicine—Bromley Group.
General Surgery—South-East Kent Group.
Obstetrics and Gynæcology—Bromley Group.
Psychological Medicine—Bexley Group.
E.N.T. Surgery—Bromley Group.
Orthopædic and Traumatic Surgery—Medway and Gravesend Group.
Clinical Pathology—Lewisham Group.
Diagnostic Radiology—Bromley Group.
Physical Medicine—Bromley Group.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 24th May, 1956.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications from registered practitioners for the 6 months resident appointment of CASUALTY OFFICER AND E.N.T. HOUSE SURGEON (House Officer grade), should be sent immediately to Secretary, above address, quoting HH/CHO.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT SENIOR REGISTRAR (radiodiagnostic) required. Post vacant end July.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 22nd May.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. HOUSE SURGEON required. Duties mainly orthopædic with some E.N.T., casualty and emergency general surgery. New Operating Theatre, Outpatient and Casualty Departments. Preference given for applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

KING'S COLLEGE HOSPITAL BOARD OF GOVERNORS AND SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in General Medicine to be made jointly by the Bodies concerned, the post to be held at King's College Hospital and in the Brighton and Lewes Hospital group. Applicants should hold the qualification of either M.D. or M.R.C.P. The successful candidate will be expected to spend the third year only in a Regional Board Hospital on an exchange basis during a 4-year tenure of the post. The appointment, which is renewable annually, is subject to the terms and conditions of service of hospital medical and dental staffs and will commence at King's College Hospital on 1st October, 1956.

Applications, quoting age, education, qualifications and experience and giving the names of 2 referees, should be sent to the House Governor, King's College Hospital, Denmark-hill, London, S.E.5, not later than 19th May, 1956.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the position of RESIDENT HOUSE SURGEON vacant on 5th June, 1956. The successful candidate will be required to carry out a fortnight's Locum duty starting on 22nd May, 1956.

Application forms from the Physician-Superintendent at the Hospital.

LONDON CHEST HOSPITAL. Hospitals for Diseases OF THE CHEST. A vacancy occurs for RESIDENT SURGICAL REGISTRAR at the Hospital's Country Branch, near Letchworth. There are 207 Beds, mainly surgical, and candidates should be experienced in thoracic surgery. Appointment for 6 months, with the prospect of renewal.

Applications, stating age, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should be forwarded at once to the House Governor, London Chest Hospital, E.2.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.1. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer), resident or non-resident, commencing 28th May, 1956. Applicants must have had practical experience in administering anæsthetics and will perform this duty when required by the Consultant Anæsthetists.

Applications, stating age, qualifications, experience, together with names and addresses of 2 referees, to be forwarded to Hospital Secretary immediately.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (248 Beds.) Applications are invited from qualified medical practitioners for appointment as RESIDENT JUNIOR HOUSE PHYSICIAN (pre-registration first or second post) for a period of 6 months, vacant 6th June, 1956.

Application form from the Secretary, Tottenham Group Hospital Management Committee (Group 4), The Green, N.15, to be returned by 12th May, 1956.

PRINCE OF WALES'S GENERAL HOSPITAL. (248 Beds.) Applications are invited from qualified medical practitioners for appointment as RESIDENT JUNIOR HOUSE SURGEON for Casualty (pre-registration first or second post) for a period of 6 months, vacant 1st June, 1956.

Application form from Secretary, Tottenham Group Hospital Management Committee (Group 4), The Green, N.15, to be returned by 19th May, 1956.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (248 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER RESIDENT SENIOR CASUALTY OFFICER, recognised for F.R.C.S. examination, for a period of 6 months, vacant 18th June, 1956.

Application form from Secretary, Tottenham Group Hospital Management Committee (Group No. 4), The Green, N.15, to be returned by 26th May, 1956.

ROYAL FREE HOSPITAL. Applications are invited from registered medical practitioners for the post of HOUSE OFFICER to the Infectious Diseases Department. Applicants would also be expected to hold a further resident post as House Officer to Paediatric Department consecutively for a period of 6 months each. Duties to commence 1st July, 1956. Salary and conditions of service in accordance with those laid down by the Ministry of Health for House Officers.

Application forms may be obtained from the Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 19th May, 1956.

ROYAL FREE HOSPITAL. Applications are invited from registered medical practitioners for the post of HOUSE OFFICER to the Paediatric Department. Applicants would also be expected to hold a further resident post as House Officer to the Infectious Diseases Department consecutively for a period of 6 months each. Duties to commence 1st July, 1956. Salary and conditions of service in accordance with those laid down by the Ministry of Health for House Officers.

Application forms may be obtained from the Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 19th May, 1956.

ROYAL MASONIC HOSPITAL, Ravenscourt Park, London, W.6. Applications are invited for the post of RESIDENT SURGICAL REGISTRAR. Appointment on or about 1st July. Gross salary—first year £850 (residential emoluments of £130 deductible); second year £965 (residential emoluments of £145 deductible).

Please state age, qualifications, past and present appointments and include 2 recent testimonials and/or the names of 2 referees. Applications should reach the undersigned (from whom further information may be obtained) on or before 17th May, 1956. R. E. LAWSON, Secretary and House Governor.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the appointment of CLINICAL ASSISTANT (whole-time). The post is graded as Senior House Officer status and will include assisting in outpatient and inpatient work. The work is that of a Junior Registrar and provides wide experience in orthopædics. The appointment to commence 1st July.

Applications to be received by 16th May. Forms of application can be obtained from the House Governor, 234, Great Portland-street, London, W.1.

ROYAL NATIONAL THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.1, and Golden-square, W.1. RESIDENT HOUSE SURGEON (post-registration post). Applications are invited for a 6 months appointment as from 1st July, 1956, with salary and conditions as laid down for House Officers in the terms and conditions of service in the National Health Service.

Applications, stating age, qualifications, full details of previous experience (particularly in this specialty), with copies of 1–3 recent testimonials, should be sent to the House Governor.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. (279 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. RESIDENT SURGICAL OFFICER (Registrar grade) required at above Hospital. Duties include supervision of House Officers, and acting as general practitioner to resident staff. Post is recognised for F.R.C.S. Candidates may visit Hospital by direct appointment.

▶ Application forms obtainable from, and returnable to, the Secretary, Royal Northern Hospital, N.7, by 15th May, 1956.

SOUTH LONDON HOSPITAL FOR WOMEN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of OBSTETRIC HOUSE SURGEON. Recognised for the M.R.C.O.G. Appointment is for 6 months from 5th July, 1956.

Forms for application from the Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN, Clapham Common, S.W.4. Applications are invited from registered Women medical practitioners for the appointment of RESIDENT MEDICAL OFFICER (Senior House Officer grade). Appointment for 1 year. Duties include care of children's ward. Vacant 17th July, 1956.

Application forms from the Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of GYNÆCOLOGICAL HOUSE SURGEON. Vacant 3rd July, 1956, for 6 months. Recognised for the M.R.C.O.G.

Application forms from the Secretary.

ST. ANN'S GENERAL HOSPITAL, N.15. Applications are invited from registered medical practitioners for the appointment of RESIDENT HOUSE SURGEON (Senior House Officer) to above Hospital for a period of 6 months from 14th June, 1956.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 19th May, 1956.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR to Rheumatism Unit, non-resident, vacancy August, 1956. Post offers wide clinical and research experience both in the rheumatic diseases and general medicine.

Application forms from Group Secretary, St. Luke's Hospital, Chelsea, S.W.3, to be returned within 14 days of advertisement (please enclose stamped addressed envelope).

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. (581 Beds.) Applications are invited to fill the post of SENIOR HOUSE OFFICER (orthopædic, ophthalmology, plastics, E.N.T., &c.).

Applications, stating age, qualifications, experience, &c., together with names and addresses of 2 referees, to be forwarded to Hospital Secretary immediately.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, Lisle-street, Leicester-square, London, W.C.2. Applications are invited for the post of Whole-time REGISTRAR in the Department of Pathology. Candidates should be specially interested in histopathology of the skin. Previous experience in pathology desirable but not essential.

Applications, stating age, nationality, qualifications, and experience, with names of 3 referees, to the Secretary to the Board of Governors by 12th May, 1956.

ST. MARY'S HOSPITAL, W.2. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST, for a first period of 6 months from a date to be arranged; remuneration to be at Senior House Officer rates. Applicants should have held 2 House Officer appointments at this Hospital or another General Hospital approved by the Board of Governors, and preference will be given to those intending to specialise in pathology.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 23rd May, 1956.

ST. MARY'S HOSPITAL, W.2. Diagnostic Radiological DEPARTMENT. Applications are invited for a "POST-GRADUATE TRAINEESHIP" from persons intending to take the D.M.R.D. Course in London, October, e.g. 1956–1958. The possession of a higher qualification would be advantageous. The successful candidate will be required to take up his duties on 1st October, 1956. The appointment will be for 1 year, renewable for a second year, and will be remunerated at Senior House Officer rates.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 19th May, 1956.

ST. TERESA'S MATERNITY HOSPITAL, The Downs, Wimbledon, S.W.20. (40 Beds.) Applications are invited for the appointment of RESIDENT OBSTETRIC HOUSE OFFICER for 6 months in the first instance, commencing on 2nd June. Salary £425–£745 according to experience. Emoluments deducted according to usual scale. Self-contained flat available in Hospital grounds. This post is ideal for those studying for higher degrees.

Applications, stating age, qualifications, nationality and experience, to the Medical Secretary.

WEST LONDON HOSPITAL, Hammersmith-road, W.6. HOUSE OFFICER (pædiatrics, E.N.T., ophthalmic, dental and dermatology) required 30th May.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary by 12th May.

WESTMINSTER CHILDREN'S HOSPITAL, West-MINSTER HOSPITAL TEACHING GROUP. MEDICAL REGISTRAR required from 1st July, 1956, initially for 1 year.

Apply, naming 3 referees, to the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1, by 15th May, 1956.

WHIPPS CROSS HOSPITAL, London, E.11. Applications are invited for the post of HOUSE SURGEON (pre-registration) in the Orthopædic Department. Post recognised for the F.R.C.S. and vacant early June.

Application forms from the Hospital Secretary to be returned by 14th May, 1956.

WHIPPS CROSS HOSPITAL, London, E.11. Applications are invited for the post of HOUSE SURGEON (pre-registration) in the Gynæcology and Urology Departments. Post vacant early June.

Application forms from the Hospital Secretary to be returned by 14th May, 1956.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of SENIOR HOUSE OFFICER in the E.N.T. and Ophthalmology Departments at above Hospital.

Application forms from the Hospital Secretary to be returned by 15th May, 1956.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. RESIDENT HOUSE SURGEON required for 6 months from 15th June, 1956, plus 14 days Locum from 1st June, 1956. Pre-registration candidates eligible.

Applications, with full details and names of 2 referees, to Hospital Secretary by 16th May, 1956.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1 There will be a vacancy on 8th October, 1956, for a RESIDENT SENIOR DENTAL HOUSE SURGEON. The post is recognised for the Fellowship in Dental Surgery, Royal College of Surgeons. Experience is given in both oral surgery and orthodontics.

Further particulars and form of application, which must be returned not later than 11th June, 1956, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies for the following Senior House Officers on 15th October, 1956:—

2 HOUSE PHYSICIANS.
1 HOUSE SURGEON.

Further particulars and form of application, which must be returned not later than Monday, 11th June, 1956, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 16th September, 1956, for a JUNIOR RESIDENT ANÆSTHETIST (Senior House Officer).

Full particulars with form of application, which must be returned not later than Monday, 11th June, 1956, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

ABERDEEN (near). THE DEESIDE SANATORIA. Applications are invited for the post of SENIOR HOUSE OFFICER. The Deeside Sanatoria includes Tor-na-Dee and Glen O' Dee located 7 and 18 miles from Aberdeen, respectively, and the successful applicant may be required to work at either Hospital. A Thoracic Unit is located at Tor-na-Dee and a large number of thoracic surgery cases are dealt with. The post offers valuable training in the selection of cases for major surgery and in their preoperative and postoperative management. The appointment is tenable in the first instance for 1 year.

Applications, together with the names and addresses of 2 referees, should be sent to the Secretary, Board of Management for the Aberdeen Special Hospitals, 6, Queen's-terrace, Aberdeen, as soon as possible.

ABERDEEN. KINGSEAT MENTAL HOSPITAL, NEWMACHAR, ABERDEEN. SENIOR HOUSE OFFICER (resident or non-resident) required for above Hospital of 820 Beds. Salary and conditions as per national scale (£745 p.a., less £150 if resident).

Applications, with full details, to Physician-Superintendent, Kingseat Hospital, Newmachar, Aberdeenshire.

ABERDEEN MATERNITY HOSPITAL: ABERDEEN ROYAL INFIRMARY. Applications are invited for the post of SENIOR HOUSE OFFICER in the Department of Obstetrics and Gynæcology. The appointment is tenable for 1 year. Rotation of duties is arranged to meet the needs of clinical training. The post is recognised in both obstetrics and gynæcology for the M.R.C.O.G.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be sent to the Group Medical Superintendent, Royal Aberdeen Hospital for Sick Children, Westburn-drive, Aberdeen, within 10 days of appearance of this advertisement.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. SENIOR HOUSE OFFICER (or REGISTRAR if suitably qualified) in General Medicine required, vacant early June.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancashire.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required to assist Consultant Geriatrician in a developing unit which serves the catchment area of the Hospital Management Committee, with main duties at Ashton-under-Lyne General Hospital. There is a full scope for the study of clinical medicine and the post is suitable for a young Physician wishing to work for higher qualifications or interested in social medicine and rehabilitation. Salary £745 p.a.

Applications, together with 2 references, to the Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

ASHFORD HOSPITAL, Ashford, Middlesex. Required, RESIDENT HOUSE SURGEON (Male) for Traumatic and Orthopædic Unit. Preference given to pre-registration candidates.

Applications, stating age, qualifications and experience with copies of up to 3 recent testimonials, to Medical Director of Hospital immediately.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDEVILLE HOSPITAL. HOUSE SURGEON for Gynæcology Department. Post recognised for M.R.C.O.G., vacant 2nd June, 1956.

Applications from registered practitioners, with 2 testimonials, to the Administrative Officer as soon as possible.

BATLEY. THE GENERAL HOSPITAL, Carlinghow Hill, BATLEY.

SENIOR HOUSE OFFICER (resident).

HOUSE SURGEON.

Applications are invited for the above posts which are available immediately. The Hospital has 99 Beds which are allocated to the specialties of general surgery, E.N.T., orthopædics and ophthalmology.

Applications in writing to the Administrative Officer enclosing copies of 2 testimonials.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required in Area Laboratory with attendance at Branch Laboratory, Driffield. Offers experience all branches of pathology. Salary £745.

Detailed applications to Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) ORTHOPÆDIC HOUSE SURGEON (first, second, or third post). Married accommodation available. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S. Vacant mid-May.

Apply to Group Secretary.

BLACKBURN (near). BROCKHALL HOSPITAL FOR MENTAL DEFECTIVES, LANGHO, near BLACKBURN, LANCASHIRE. RESIDENT MEDICAL OFFICER required (Junior Hospital Medical Officer). 2159 Beds in modern and fully equipped colony, excellent facilities for gaining experience of mental deficiency practice. National Health Service conditions. Salary £775–£50–£1075. Accommodation (modern flat) available for single or married man or woman.

Applications, with usual particulars, to be sent to the Medical Superintendent. M. LAWRENCE,

Secretary of the Hospital Management Committee.

BEDFORD GENERAL HOSPITAL. (437 Beds.) 2 resident Pre-registration HOUSE PHYSICIANS required approximately end May.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (780 Beds.) HOUSE PHYSICIAN (general medicine) required. Recognised for pre-registration. Vacant 1st July, 1956. Responsible for approximately 80 male and female medical beds. Unit under control of 2 Consultant Physicians.

Detailed applications, with copies of 2 recent testimonials, to Group Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Birmingham Group 25 (Selly Oak), Oak Tree-lane, Birmingham 29**

REGISTRAR (general surgery), resident. Duties at Solihull and Little Bromwich General Hospitals. Higher qualification desirable. Residential married quarters available.

(2) **Mid-Worcestershire Group, Birmingham-road, Bromsgrove**

REGISTRAR (obstetrics/gynæcology). Duties at Bromsgrove General Hospital (423 Beds) (7 notional half-days), and Dudley and Stourbridge Group (4 notional half-days).

Application forms from Hospital Management Committee Secretaries, to be returned before 14th May, 1956.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer grade). The post is tenable for 1 year. The appointment is recognised for the purpose of taking the F.F.A.R.C.S. examinations.

Application forms from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of RESIDENT REGISTRAR in Anæsthetics to the United Hospitals. The appointment is tenable for 1 year in the first instance. Preference will be given to candidates who have passed Part I, D.A., or Primary F.F.A.R.C.S.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him by 19th May, 1956.

BIRMINGHAM, 9. YARDLEY GREEN HOSPITAL. THORACIC SURGICAL UNIT. (66 Beds.) Vacancy for SENIOR HOUSE OFFICER. No previous experience in thoracic surgery necessary.

Applications, stating age, qualifications, training, and experience, together with names of 2 referees, to be addressed to Group Secretary, Yardley Green Hospital, Birmingham, 9.

BLACKPOOL. VICTORIA HOSPITAL. (Acute General —348 Beds.) BLACKPOOL AND FYLDE HOSPITAL MANAGEMENT COMMITTEE. CLINICAL ASSISTANT (E.N.T. Department). 5 sessions per week. Salary at the rate of £875 p.a. Eminently suitable post for practitioner studying for D.L.O.

Applications, stating age, experience, and giving names and addresses of 2 referees, should be addressed to the Hospital Secretary.

BLACKPOOL. VICTORIA HOSPITAL. (348 Beds.) Applications are invited for the pre-registration post of RESIDENT HOUSE OFFICER (orthopædic and casualty), vacant on 1st July next, which is recognised for the F.R.C.S. This is an acute hospital serving the whole of the Blackpool and Fylde area.

Applications, stating age, qualifications, experience, together with the names and addresses of 2 referees, should be addressed to the Hospital Secretary.

BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL, CHRISTCHURCH, HANTS. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. 2 HOUSE PHYSICIANS (pre-registration interns) required for general medicine posts becoming vacant on 6th and 12th June, 1956, at the above Hospital of 259 Beds (including 79 acute medical, 34 pediatric, 6 chest diagnostic and a Geriatric Unit). Duties also include attendance at outpatient clinics at the Royal Victoria Hospital, Boscombe, Bournemouth.

Applications, with copies of testimonials, to the Hospital Secretary at the Hospital.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. **BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for the appointment of HOUSE SURGEON for general and thoracic surgery. The post, which is recognised for the F.R.C.S. examination and pre-registration purposes, becomes vacant on 12th June, 1956.

Applications to the Hospital Secretary at the Hospital.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. **BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for the appointment of GENERAL HOUSE SURGEON. The post, which becomes vacant on 19th May, 1956, is recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Hospital Secretary at the Hospital.

BRIGHTON GENERAL HOSPITAL. House Surgeon (recognised for F.R.C.S.), vacant 17th June, 1956. The post is recognised as a pre-registration appointment.

Applications, stating age, qualifications, experience, and giving the names of 2 referees, should be sent to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (312 Beds.) HOUSE SURGEON required mid-May. Recognised for pre-registration and F.R.C.S.

Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRISTOL. COSSHAM AND FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON in General Surgery required at Cossham Memorial Hospital, Kingswood, Bristol, now until 31st July, 1956. 88 Beds acute medicine and surgery. Recognised pre-registration post but fully registered practitioners considered.

Apply to Group Secretary, Frenchay Hospital, Bristol, quoting qualifications, experience and names of 2 referees.

BRISTOL. HAM GREEN HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of ASSISTANT VENEREOLOGIST (Junior Hospital Medical Officer), Male, in the Bristol Group of clinics.

Applications, giving details of qualifications, experience, &c., and names and addresses of 2 referees, to be forwarded to the Secretary, Ham Green Hospital, Pill, near Bristol.

BRISTOL (near). HAM GREEN HOSPITAL, Pill, BRISTOL. Applications are invited for the post of SENIOR HOUSE OFFICER in the tuberculosis wards (188 Beds) of the above Hospital. The Hospital is fully equipped for the modern treatment of pulmonary tuberculosis including regular major thoracic surgery. Appointment for 1 year renewable.

Apply Secretary, Ham Green Hospital, Pill, near Bristol.

BROMSGROVE GENERAL HOSPITAL, Worcestershire. (123 Beds.) HOUSE OBSTETRICIAN AND GYNÆCOLOGIST (pre-registration) required at the above Hospital, at present 33 maternity, 20 gynæcological beds.

Applications, with the names of 3 referees, to the Hospital Secretary.

BURY ST. EDMUNDS. WEST SUFFOLK GENERAL HOSPITAL. (285 Beds.) Applications invited for the following posts :—

(*a*) SENIOR HOUSE OFFICER for orthopædic and casualty duties. Recognised for F.R.C.S. (Surgical). Vacant early July. There is also a Junior Hospital Medical Officer Casualty Officer.

(*b*) HOUSE SURGEON for general surgical and other duties, vacant late May.

(*c*) HOUSE SURGEON for general surgical duties. Recognised for F.R.C.S. Vacant early July.

(*d*) HOUSE SURGEON for obstetric and gynæcological duties. Recognised for D.Obst.R.C.O.G. Vacant early August.

(*e*) HOUSE PHYSICIAN for pædiatric and general medical duties, vacant early July.

(*f*) HOUSE PHYSICIAN for general medical duties, vacant late May.

All posts except (*a*) are recognised for pre-registration, but for post (*d*) it is considered advisable to have held 1 previous House Officer post.

Inquiries and applications, with names and addresses of 3 referees, should be sent to the Hospital Secretary.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Resident ANÆSTHETIC SENIOR HOUSE OFFICER required end of May for 1 year. Anæsthetic experience essential.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to Secretary by 16th May.

CAMBRIDGE. MATERNITY HOSPITAL. Resident OBSTETRICAL OFFICER (second or subsequent post) for 6 months from 1st July. Recognised Pre-registration Service. Recognised for M.R.C.O.G. and D.Obst.R.C.O.G. examinations.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to Secretary, United Cambridge Hospitals, Addenbrooke's Hospital, by 19th May. Interviews 29th May.

CARDIFF. PRINCE OF WALES ORTHOPÆDIC HOSPITAL, RHYDLAFAR, CARDIFF. SENIOR HOUSE OFFICER required. Regional Orthopædic Centre for South Wales area of 220 Beds increasing to 290 and branch of 70 Beds. Outpatients clinic in Cardiff. Single accommodation at Hospital at Rhydlafar.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (medical). Salary and conditions of service in accordance with the National Health Service scale.

Applications, stating age, qualifications and present post, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke, as soon as possible.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (General Children's Hospital of 818 Beds.) Whole-time REGISTRAR required for surgical and orthopædic duties. Position vacant at the end of May. Applicants are invited to visit the Hospital by appointment with the Physician-Superintendent.

Applications, on forms obtainable from the Group Secretary, should be submitted as soon as possible.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. SURGICAL REGISTRAR to the Thoracic Unit (non-resident) Post recognised for F.R.C.S.

Forms of application, returnable by 19th May, from the Group Secretary at above address.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). (430 Beds.) RESIDENT HOUSE SURGEON (Senior House Officer or Intern) required for the Gynæcological (30 Beds) and E.N.T. (16 Beds) Departments. Duties to commence immediately. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, as soon as possible.

CHESTERFIELD ROYAL HOSPITAL. (279 Beds.) RESIDENT HOUSE SURGEON required immediately at above Hospital. Post recognised for Pre-registration Service and F.R.C.S. examinations. National salary and conditions.

Apply M. H. BOONE, Secretary, Chesterfield Hospital Management Committee.

CHELMSFORD. ST. JOHN'S HOSPITAL. House SURGEON (pre-registration first, second, or third post). Duties commence 1st June, 1956. The Hospital deals with a large number of routine and emergency cases. The post is recognised for training for the F.R.C.S.

Applications stating age, nationality, qualifications and experience, together with copies of recent testimonials, should be received not later than 8th May, 1956, by the Secretary, Chelmsford Group Hospital, Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. House PHYSICIAN (pre-registration, first, second, or third appointment), Male or Female, to commence as soon as possible.

Applications, stating age, nationality, qualifications, and experience, together with recent testimonials, to the Secretary, Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. (162 Beds.) Applications are invited for the post of Locum HOUSE SURGEON (resident). Required immediately until the middle of June.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. (162 Beds.) Applications are invited for the post of RESIDENT HOUSE PHYSICIAN (pre-registration post) to work in the general medical wards of the Hospital. Duties will commence mid-June.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CROYDON. GENERAL HOSPITAL. (200 Beds.) Locum Tenens SENIOR CASUALTY OFFICER (Registrar status) required between 28th May–15th June, and 2nd–16th September, all dates inclusive.

Application forms from Group Secretary, Hospital Management Committee, General Hospital, London-road, Croydon, to be returned immediately.

CROYDON. MAYDAY HOSPITAL. (611 Beds.) House PHYSICIAN (pre-registration) for a period of 6 months from 1st June.

Application forms obtainable from Group Secretary, Croydon Group Hospital Management Committee, General Hospital, Croydon, to be returned as soon as possible.

DARLINGTON MEMORIAL HOSPITAL. Applications are invited from Male or Female practitioners with experience for the post of SENIOR HOUSE OFFICER (surgery). Establishment: 1 Registrar, 1 Senior House Officer, 2 House Officers (90 surgical beds). The post is recognised for the F.R.C.S. (Eng.). Salary £745 p.a., deduction of £153 for full residential emoluments. The post is tenable for 12 months and is renewable annually.

Apply with references, stating age and experience, to—
G. W. BECKWITH, Group Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Senior HOUSE OFFICER (E.N.T.). Recognised for F.R.C.S. Post now vacant. Duties include attendance at 2 other hospitals within the Group. Canvassing disqualifies.

Applications, with copies of 2 recent testimonials, to Secretary.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP. BIRMINGHAM REGION.

The Guest Hospital (154 Beds)

SENIOR HOUSE OFFICER (casualty). Post now vacant.

SENIOR HOUSE OFFICER (anæsthetics). Post now vacant.

Wordsley Hospital (478 Beds)

SENIOR HOUSE OFFICER (medical). Post now vacant.

Apply, Group Secretary, Guest Hospital, Dudley.

DUNFERMLINE AND WEST FIFE HOSPITAL, Reid-street. DUNFERMLINE. (General Surgery—117 Beds.) Applications are invited for appointment as HOUSE SURGEONS (2 Male and 1 Female), to commence duty in July or August, 1956; qualified or undertaking Pre-registration Service. Resident. Salary and conditions of service in accordance with National Health Service Whitley Council agreements. Posts superannuable.

Apply to the Surgeon-Superintendent.

EDINBURGH NORTHERN GROUP OF HOSPITALS. SENIOR HOUSE OFFICER in Anæsthetics, resident, required for Western General Hospital, Edinburgh. This post is recognised for the D.A. and F.F.A.R.C.S.

Applications, with names of 2 referees, to the Medical Superintendent, Western General Hospital, Edinburgh, 4.

EDINBURGH. ROYAL HOSPITAL FOR SICK CHILDREN. Applications are invited from registered medical practitioners for 2 appointments of RESIDENT SENIOR HOUSE OFFICER (1 medical, 1 surgical) for 12 months commencing 1st October, 1956. National Health Service scale.

Applications, stating age, qualifications and experience, and names of 2 referees, to be sent before 31st May to Medical Superintendent, Edinburgh Central Hospitals, 18, Rillbank-terrace, Edinburgh, 9.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON required (third post), vacant 23rd June, 1956. Post provides experience and duties in both surgery and orthopædics. 6 months appointment. Recognised for F.R.C.S. by the Royal College of Surgeons.

Applications, with names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. Temporary REGISTRAR in General Surgery required for general surgical duties. Appointment vacant 1st June, 1956. Duration, 1–2 months.

Applications, with names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, at Chase Farm Hospital, by 11th May, 1956.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. Temporary REGISTRAR in Orthopædics and General Surgery required for general surgical duties. Appointment vacant 29th May, 1956. Duration, 1–2 months.

Applications, with names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, at Chase Farm Hospital, by 11th May, 1956.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. RADIOLOGICAL REGISTRAR, West Suffolk Group of hospitals. Main hospital West Suffolk General, Bury St. Edmunds (285 Beds). Successful applicant will work directly under the Consultant Radiologist. Appointment for 1 year, renewable for second year.

Applications, stating age, experience, and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 21st May, 1956. Candidates are invited to visit the Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. (1) SURGICAL REGISTRAR, Ipswich and East Suffolk Hospital. Post recognised for F.R.C.S. Appointment for 1 year, renewable for second year. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, Ipswich and East Suffolk Hospital (Anglesea Road Wing), Ipswich.

(2) REGISTRAR in Plastic Surgery, Regional Plastic Surgery and Burns Unit (28 Beds), West Norwich Hospital (Norfolk and Norwich Hospital Group). Post offers wide experience and training. Appointment for 1 year, renewable for second year. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital, Norwich.

Applications, stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 14th May, 1956.

EDGWARE GENERAL HOSPITAL. (715 Beds.) Resident SENIOR HOUSE OFFICER in Pathology required at above Hospital. Salary £745 p.a. Deduction of £155 p.a. for board, lodging, &c.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, to Group Secretary, Edgware General Hospital, Edgware, Middlesex, by 9th May, 1956.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. 2 RESIDENT HOUSE PHYSICIANS for above Hospital. Posts vacant 13th and 20th June, 1956. 6 months appointments. Posts recognised for pre-registration purposes.

Applications, stating age, qualifications, experience and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 19th May, 1956.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. RESIDENT PÆDIATRIC HOUSE PHYSICIAN for above Hospital. Post vacant 1st June, 1956. 6 months appointment. Post recognised for pre-registration and D.C.H. purposes.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 testimonials, to Medical Director of Hospital by 12th May, 1956.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) Applications are invited for the appointment of SENIOR HOUSE OFFICER in Geriatrics. The duties will involve the medical treatment and rehabilitation of elderly sick in a new and developing department of the hospital. There are facilities for postgraduate study.

Applications, stating age, qualifications, experience, and the names and addresses of 2 referees, to Group Secretary by 19th May, 1956.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE PHYSICIAN required 6th June. Pre-registration post.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary at above Hospital.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from registered medical practitioners, Male and Female, for the appointment of SENIOR HOUSE OFFICER in Clinical Pathology (resident), vacant now. The successful candidate will be responsible for emergency pathological and blood transfusion duties, and will work, under the Area Pathologist, in different branches of Clinical Pathology.

Applications, with names of 2 referees, to the Hospital Secretary.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (anæsthetics), vacant 17th June, 1956. The post is recognised for the F.F.A.R.C.S. examination.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 19th May, 1956.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from pre-registered and registered medical practitioners for the appointment of HOUSE SURGEON (obstetrics and gynæcology), vacant 22nd June, 1956. The post is recognised for the M.R.C.O.G. examination (gynæcology only).

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 12th May, 1956.

GLASGOW NORTHERN HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the post of SENIOR HOUSE OFFICER in Obstetrics and Gynæcology at Stobhill Hospital, Glasgow. The appointment will be for 1 year in the first instance.

Applications, stating age, qualifications, experience and present appointment and naming 3 referees, to be lodged with the Secretary, 13, Woodside-place, Glasgow, C.3, by 15th May, 1956.

GLASGOW. HAWKHEAD (MENTAL) HOSPITAL, 510, Crookston-road, GLASGOW, S.W.3. Applications are invited for the post of SENIOR HOUSE OFFICER in Psychiatry (Male or Female, resident or non-resident). The post offers wide experience and training in all aspects of psychiatry (inpatient and outpatient), and all modern methods of treatment are carried out. Recognised for D.P.M.

Applications, together with the names of 2 referees, should be forwarded as soon as possible to the Physician-Superintendent at above address.

GAINSBOROUGH. JOHN COUPLAND HOSPITAL. (40 Beds.) Applications are invited for the post of RESIDENT MEDICAL OFFICER. The Hospital has a number of both medical and surgical beds. Salary is in accordance with Junior Hospital Medical Officer grade of the terms laid down for hospital medical and dental staffs. Married quarters are available.

Applications, giving full particulars, should be forwarded as soon as possible to—

R. W. HOWICK, Group Secretary,
Lincoln No. 1 Hospital Management Committee.
County Hospital, Lincoln.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (233 Beds.) RESIDENT HOUSE PHYSICIAN required from 1st June. Post is tenable for 6 months and is recognised for pre-registration candidates.

Applications, with copies of 3 testimonials, should be sent to the Hospital Secretary as soon as possible.

FAREHAM, HAMPSHIRE. KNOWLE HOSPITAL. KNOWLE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at above Hospital where all forms of modern psychiatric treatment are undertaken. Previous psychiatric experience is not essential as training facilities will be available. Terms and conditions of service will be as approved for hospital medical staff employed in the National Health Service. Salary £775–£50–£1075 p.a. Married or single accommodation is available, but officers who so desire may live outside the Hospital.

Applications should be sent without delay to the Physician-Superintendent, Knowle Hospital, Fareham, Hants.

HEREFORD GENERAL HOSPITAL. (154 Beds, 71 surgical.) HOUSE OFFICER (general surgery). Post vacant early June. Hospital recognised by Royal College of Surgeons.

Applications, with copies of 2 recent testimonials, to the Secretary, Hospital Management Committee, Victoria House, Eign-street, Hereford.

HILLINGDON HOSPITAL, near Uxbridge, Middlesex. (General—621 Beds.) PÆDIATRIC REGISTRAR required. Previous pædiatric experience essential. Duties include experience in Children's Medical Ward, in Neonatal Unit, and Pædiatric Outpatient's Clinics. Unit recognised for D.C.H. Candidates may visit Hospital by direct appointment.

Application forms available from, and returnable to, Group Secretary, Uxbridge Group Hospital Management Committee, The Furze, Pield Heath-road, near Uxbridge, Middlesex, by 21st May.

HILLINGDON HOSPITAL, near Uxbridge, Middlesex. (General—621 Beds.) 3 HOUSE SURGEONS required in General Surgery. General and traumatic, general and gastro-enterology, and general and genito-urinary. All posts are recognised for the F.R.C.S. and for Pre-registration Service. Posts vacant early June.

Apply, together with copies of not more than 3 recent testimonials, to Medical Director by 21st May.

HOLT, NORFOLK. KELLING HOSPITAL AND DEPARTMENT OF THORACIC SURGERY. Applications are invited for the following posts which are now vacant.

(1) Locum JUNIOR HOSPITAL MEDICAL OFFICER (6–9 months).

(2) SENIOR HOUSE OFFICER.

This Hospital (180 Beds) deals with tuberculous and non-tuberculous chest conditions and offers excellent experience in chest medicine and thoracic surgery.

Applications, stating age, sex, qualifications, nationality and experience, together with names of 2 referees, to the Group Secretary, Cromer Area Hospital Management Committee, Cromer, Norfolk, who will be pleased to supply any other information concerning the appointments.

HOUNSLOW HOSPITAL, Staines-road, Hounslow, MIDDLESEX. (General Acute—81 Beds.) Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN. Recognised pre-registration appointment. Vacant 25th June, 1956.

Applications, stating qualifications and age, together with copies of up to 3 recent testimonials, or names for reference, to the Hospital Secretary.

HOUNSLOW HOSPITAL, Staines-road, Hounslow, MIDDLESEX. (General Acute—81 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON. Recognised pre-registration appointment. Vacant 20th May, 1956.

Applications, stating qualifications and age, together with copies of up to 3 recent testimonials, or names for reference, to the Hospital Secretary.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE SURGEON—this post includes gynæcology, E.N.T. and general surgery. Pre-registration post. Vacant now.

Applications, giving full details, and copies of 2 recent testimonials, to the Hospital Secretary.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical) vacant mid-June. Post recognised for pre-registration purposes.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.) HOUSE SURGEON (resident) required. Pre-registration post, vacant now. National scale of salary.

Apply to Hospital Administrator immediately.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. Locum REGISTRAR (surgery) required from 23rd June to 9th July, 1956.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary at once.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. CASUALTY OFFICER (Junior Hospital Medical Officer) required.

Applications, stating 2 names for reference, should be sent to the Hospital Secretary.

HENLEY-ON-THAMES, OXFORDSHIRE. PEPPARD CHEST HOSPITAL. (236 Beds.) Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER. Resident accommodation available for a single applicant. Further details may be obtained from the Physician-Superintendent.

Applications, with the names of 2 referees, should be addressed to the Acting Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of RESIDENT HOUSE PHYSICIAN (Male or Female), second post held. Recognised pre-registration post. 6 months appointment. Preference given to applicants who have held resident surgical or medical posts in general hospital. Duties to commence 19th June, 1956.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

ILFORD. KING GEORGE HOSPITAL, Eastern-avenue. There will be vacancies for the following at above Hospital.

HOUSE SURGEON—31st May, 1956. First or second post pre-registration.

HOUSE SURGEON—14th June, 1956. Second post pre-registration.

The posts will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary, Ilford
and Barking Group Hospital Management Committee.

ILFORD. KING GEORGE HOSPITAL, Eastern-avenue. There will be a vacancy for a HOUSE SURGEON at above Hospital on 15th July, 1956. First or second post pre-registration. The post will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary, Ilford
and Barking Group Hospital Management Committee.

ILFORD. KING GEORGE HOSPITAL, Eastern-avenue. There will be a vacancy for a HOUSE PHYSICIAN at above Hospital on 28th June, 1956. First or second post pre-registration. The post will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary, Ilford
and Barking Group Hospital Management Committee.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the E.N.T. and Ophthalmic Departments, vacant on 13th June, 1956. The post is recognised for pre-registration and for the D.L.O. examination.

Applications, giving full particulars and copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL, Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department, vacant on 13th June, 1956. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Senior General Consulting Surgeon. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the General Consultant Surgeon, vacant on 12th May, 1956. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE PHYSICIAN, vacant on 1st June, 1956. Approved pre-registration post.

Applications, stating age, nationality and experience, together with copies of 3 recent testimonials, to reach the Hospital Secretary by 7th May, 1956.

LIVERPOOL, 9. WALTON HOSPITAL. Applications are invited for appointment of a HOUSE PHYSICIAN (general medicine) from 1st June (recognised pre-registration post).

Apply to Physician-Superintendent, stating age, experience, qualifications, and names of 2 referees.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a post as SENIOR REGISTRAR in Radiology for the period to 30th September, 1956.

Apply by 16th May, 1956, on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. SENIOR HOUSE OFFICER (resident) in Medicine required. Post now vacant.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 recent testimonials, to be sent to the Secretary as soon as possible.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (197 Beds.) RESIDENT HOUSE SURGEON (general surgery). Post vacant 31st May. Recognised for pre-registration, and F.R.C.S. Post provides excellent experience. Good accommodation available.

Apply Hospital Secretary.

LEEDS REGIONAL HOSPITAL BOARD. Short-term LOCUM TENENS appointments in the Registrar grade are constantly available at hospitals in the area of the Board, particularly in the specialties of anæsthetics, general medicine, general and orthopædic surgery, and psychiatry.

Interested practitioners, suitably experienced, should communicate with the Secretary, Joint Registrars Committee, Park-parade, Harrogate.

LEEDS REGIONAL HOSPITAL BOARD. Senior Registrar vacancies.

Anæsthetics

Duties initially at the Thoracic Surgical Units of the General Infirmary at Leeds and at Pinderfields General Hospital, Wakefield. The person appointed will be expected, if required, to interchange duties with the Senior Registrar in the Department of Anæsthetics at the General Infirmary.

Chest Diseases

Castle Hill Sanatorium, Cottingham, near Hull (220 medical and 51 thoracic surgical beds). Non-resident.

Infectious Diseases

Duties mainly at Seacroft (Infectious Diseases) Hospital, Leeds (200 I.D. Beds with a high average occupancy). The post will be resident and previous experience in infectious diseases is essential.

Orthopædic Surgery

Hull A Group. Duties mainly at Hull Royal Infirmary (47 orthopædic beds). Non-resident.

Pathology

Regional Transfusion Centre, Seacroft, with minor relief duties in General Pathology at St. James's Hospital, Leeds. 52,000 pints of blood taken annually. Previous experience in all branches of pathology desirable. Non-resident.

Radiology

Duties at hospitals in Hull A, Hull B and East Riding Groups. Non-resident.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 24th May, 1956.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Chest Diseases

Scotton Banks Sanatorium, Knaresborough (306 Beds). Resident. Visiting staff includes Teaching Hospital Consultants.

General Medicine

(*a*) Hull A Group (230 general medical beds) and East Riding Group (80 general medical beds). Duties, 6 11 Hull A and 5/11 East Riding. Holder to reside in Beverley.

(*b*) Regional Rheumatism Centre, Harrogate (240 Beds) (9 sessions), and Rheumatism Clinic, General Infirmary at Leeds (2 sessions). Resident at the Royal Bath Hospital, Harrogate.

Obstetrics and Gynæcology

Duties at St. Luke's Hospital, Bradford (118 obstetric and 105 gynæcological beds). Resident.

Pædiatrics

Victoria Hospital for Sick Children, Hull (150 Beds), and other General Hospitals with pædiatric beds in the Hull A and East Riding Hospital Management Committee Groups. Non-resident.

Psychiatry

(*a*) Clifton Hospital, York (1100 Beds). Resident or non-resident.

(*b*) Menston Hospital, near Leeds (2500 Beds).

If desired, facilities for attending at Leeds University will be provided if the successful candidates are studying for D.P.M.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 17th May, 1956.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. REGISTRAR in General Medicine (cardiological) required from 1st June, 1956, non-resident. Terms and conditions of service for hospital medical staff apply.

Applications, giving details of age, qualifications, previous posts with dates, and 3 names for reference, to be sent to the Sub-Dean, School of Medicine, Leeds, 2, by 14th May, 1956.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. REGISTRAR in Anæsthetics required for duties in the Teaching Hospital Group. Terms and conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, experience with relevant dates, and giving 3 names for reference, should be forwarded to the Sub-Dean, The Medical School, Leeds, 2, not later than 12th May, 1956.

LEEDS. THE UNITED LEEDS HOSPITALS. The MATERNITY HOSPITAL AT LEEDS. SENIOR HOUSE OFFICER required for the Pædiatric Unit for a period of 1 year. Post vacant 5th July, 1956. Successful candidate will work under the direction of the Professor of Pædiatrics and Child Health and be responsible to him for the supervision and management of healthy and ailing babies in the Leeds Maternity Hospital. Previous experience of resident house posts in pædiatrics and/or obstetrics is desirable but not absolutely essential.

Applications, stating age, qualifications, previous posts with dates, and the names of 2 referees, should be sent to the Secretary to the Board, the General Infirmary at Leeds, as soon as possible.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. SENIOR HOUSE OFFICER in Neurosurgery required for a period of 6 months from 1st May, 1956. The appointment will be renewable for a further period of 6 months. Terms and conditions of service for hospital medical staff apply.

Applications, giving details of age, qualifications, posts held with dates, and with 3 names for reference, should be sent to the Secretary to the Board as soon as possible.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. Post vacant May, 1956. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available, and the post is recognised for the purpose of the F.R.C.S. and the D.L.O. Salary will be £745 a year, less £150 a year for residential emoluments.

Applications immediately to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. Salary £745 a year, less £150 a year for board and lodging. Post vacant June, 1956.

Applications to the Administrative Officer at the Hospital.

MANCHESTER, 20. CHRISTIE HOSPITAL AND HOLT RADIUM INSTITUTE. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (surgery) at the above Hospital.

Applications, stating age, qualifications, nationality, present post, experience, and names of 2 referees, to the Group Secretary, Withington Hospital, Manchester, 20, as soon as possible.

MANCHESTER REGIONAL HOSPITAL BOARD.

(*a*) SENIOR REGISTRAR in Psychiatry in the Oldham and District Group of hospitals, with duties including attendance at Consultant Psychiatric Clinics and participation in treatment of inpatients and outpatients in the Group. The person appointed may be required to undertake a period of duty at 1 of the Regional Mental Hospitals during some part of his period of employment.

(*b*) SENIOR REGISTRAR in Dermatology with main duties at the Manchester and Salford Hospital for Skin Diseases and occasional duties at peripheral clinics in the Manchester Regional Hospital area as required.

Application forms from the Senior Administrative Medical Officer of the Board, Cheetwood-road, Manchester, 8, to be returned by 21st May, 1956.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of REGISTRAR in Pathology. The duties will be with the Stockport and Buxton Hospital Management Committee and the successful candidate will work under the direction of the Consultant Group Pathologist.

Applications, stating age, experience, and qualifications, together with copies of 2 testimonials to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, Cheshire.

MANCHESTER REGIONAL HOSPITAL BOARD. RESIDENT SURGICAL REGISTRAR required mid-May for the Royal Infirmary, Blackburn, a busy acute hospital of 262 Beds. Post recognised for F.R.C.S.

Application forms available from Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of REGISTRAR in General Surgery to the Blackpool and Fylde Group of hospitals, with main duties at Victoria Hospital, Blackpool (348 Beds). The post, which is vacant in July, is recognised under the F.R.C.S. regulations. The appointment offers an excellent opportunity for gaining practical experience in general and emergency surgery to suitable qualified candidates.

Applications, stating age, qualifications and experience, together with the names of 3 referees, should be sent to the Group Secretary, Blackpool and Fylde Hospital Management Committee, Victoria Hospital, Blackpool.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of HOUSE OFFICER in Gynæcology. Applicants must have had previous hospital experience in medicine and surgery. The post is recognised for the purpose of the M.R.C.O.G. examination. The appointment is for 6 months starting 1st July, 1956. Salary in accordance with national scale.

Application forms may be obtained from the undersigned and returned not later than 21st May, 1956.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of SENIOR REGISTRAR at the above Hospital (attached to the University Department of Ophthalmology). Whole-time post (non-resident). Tenable for 12 months, subject to renewal. Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications to be made as soon as possible on forms obtainable from the undersigned.

H. R. NORTH, General Superintendent.

MITCHAM. WILSON HOSPITAL, Cranmer-road, MITCHAM, SURREY. SENIOR HOUSE OFFICER (surgical). Duties mainly in Casualty Department. Post non-resident.

Applications, giving names of 2 referees, to Group Secretary, St. Helier Hospital, Carshalton, Surrey.

MITCHAM. WILSON HOSPITAL, Cranmer-road, MITCHAM, SURREY. RESIDENT HOUSE PHYSICIAN (not pre-registration). Appointment for 6 months in first instance.

Applications, giving names of 2 referees, to Secretary at above address.

MAIDENHEAD HOSPITAL, St. Luke's-road, Maidenhead. RESIDENT SURGICAL REGISTRAR. Hospital may be visited by direct appointment.

Application forms from, and returnable to, Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 11th May.

MEXBOROUGH. MONTAGU HOSPITAL. (168 Beds. Recognised for training for the D.A. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (anæsthetics) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 14th May, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

MIDDLESBROUGH. HEMLINGTON HOSPITAL. (282 Beds.) TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE SURGEON. This post entails duties in connection with acute surgery, gynæcology and plastic surgery beds.

Applications, stating age, qualifications, together with names for reference, to be forwarded to the Hospital Secretary.

MIDDLESBROUGH. ST. LUKE'S HOSPITAL. ST. LUKE'S HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident). Salary scale £775–£50–£1075 p.a. Furnished flat available. The post in the first instance will be tenable for a period of 4 years and is renewable. Facilities for all forms of psychiatric work are available and a Regional Training Scheme leading to the D.P.M.(Durham) is in operation. Previous experience of psychiatric work is not essential.

Applications, stating age, qualifications and appointments held, also the names of 3 referees, should be addressed to the Physician-Superintendent at the Hospital.

MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the West Kent General Hospital, and the Kent County Ophthalmic and Aural Hospital, Maidstone (total beds 254). The post, which is of Senior House Officer grade, will be vacant June, 1956, and carries a salary of £745 a year, less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A.R.C.S. examination.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, West Kent General Hospital, Maidstone.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of HOUSE PHYSICIAN, vacant 13th July, 1956. Duties include house charge of general medical and pulmonary tuberculosis beds. The post is recognised for pre-registration, is resident and tenable for 6 months. Salary in accordance with national scale.

Applications, together with 3 recent testimonials, to Medical Superintendent.

NEWMARKET GENERAL HOSPITAL, Suffolk. Senior HOUSE SURGEON (Senior House Officer grade). Tenable for 6 months in first instance. Duties mainly surgical, but a small amount of E.N.T., and ophthalmic surgery is included. Preference to candidates who wish to be trained in surgical technique and to gain experience in operative surgery.

Applications, with copies of 3 testimonials, to Medical Superintendent.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications invited for the post, now vacant, of SENIOR HOUSE OFFICER for orthopædic and casualty duties.

Applications, with 3 testimonials, to the Medical Superintendent.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. ROYAL VICTORIA INFIRMARY. Applications are invited for the whole-time non-resident appointment of SENIOR REGISTRAR in Radiology. Applicants should have spent at least 2 years as Registrar in Diagnostic Radiology and should be in possession of the D.M.R. (Diagnostic). The appointment will be for 1 year in the first instance and will be subject to terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in Ophthalmology to undertake duties at :—

Inpatient Unit (44 Beds)—Walker Gate Hospital.

Children's Unit (21 Beds)—Walker Accident Hospital.

Outpatient Department—Newcastle General Hospital.

Applications are invited from registered medical practitioners for the above post (preferably resident—single accommodation available Walker Gate Hospital). The Units are recognised for the Diploma of Ophthalmology. Salary in accordance with the terms and conditions of hospital medical and dental staffs.

Applications, together with the names and addresses of 3 referees, to be sent as soon as possible to the Secretary, Newcastle Eye Hospital, St. Mary's-place, Newcastle upon Tyne, 1.

NEWCASTLE REGIONAL HOSPITAL BOARD. North WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR OBSTETRICIAN AND GYNÆCOLOGIST (whole-time), resident. Primary gynæcological with some obstetrics. Main hospital 36 obstetrics and 43 gynæcology beds. Post recognised for M.R.C.O.G. Single accommodation available. Appointment commences 1st August, 1956.

Applications, with the names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 7 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. East CUMBERLAND GROUP OF HOSPITALS. Whole-time REGISTRAR PHYSICIAN, resident at the Cumberland Infirmary, Carlisle (340 Beds). Appointment for 1 year in the first instance, and may be renewed for a further period.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON for general surgery and urology, vacant 1st June, 1956. Recognised for the Final F.R.C.S. in General Surgery and recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer by 18th May, 1956.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN to the Radiotherapy Department, vacant 1st June, 1956. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer by 18th May, 1956.

NOTTINGHAM. CITY HOSPITAL. (811 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer), vacant 1st June, 1956. The post is recognised for the D.A. and the F.F.A.R.C.S. and offers wide experience; this is a busy general hospital with Departments in General, Orthopædic, Gynæcological, Thoracic, and Plastic Surgery.

Applications, stating age, nationality and qualifications, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (811 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT SURGICAL REGISTRAR required. Post becomes vacant 1st July, 1956. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 14th May, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM. CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE SURGEON, vacant 15th May, 1956. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Resident HOUSE SURGEONS (2) (first or second post) required as soon as possible for 6 months.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

OXFORD REGIONAL HOSPITAL BOARD. Registrar (whole-time) in Diseases of the Chest to the hospitals and clinics of the Aylesbury/High Wycombe Hospital Management Committees. The appointment will be for 1 year and eligible for extension for a second year. The successful candidate will be required to live in the area.

Applications on forms obtainable from the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, should reach him by 28th May, 1956.

OXFORD. UNITED OXFORD HOSPITALS. Department OF PÆDIATRICS. Applications invited for the post of NON-RESIDENT REGISTRAR at the Churchill Hospital, commencing in June. Paediatrics and neonatal.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 22nd May, 1956.

PAISLEY. RICCARTSBAR HOSPITAL. Junior HOSPITAL MEDICAL OFFICER required. The Hospital is of approximately 350 Beds and has a very active Inpatient and Outpatient Department including Child Guidance. It is recognised for the D.P.M., London University, London Conjoint and R.M.P.A. Facilities are available for attending classes at Glasgow University.

Applications should be addressed to the Physician-Superintendent at an early date.

PAISLEY AND DISTRICT HOSPITALS BOARD OF MANAGEMENT. Applications are invited for JUNIOR HOSPITAL MEDICAL OFFICER posts at the following hospitals:—

(*a*) Orthopædic Unit, Royal Alexandra Infirmary, Paisley.
(*b*) Darnley Sanatorium, Nitshill, Glasgow.
(*c*) Johnstone Sanatorium, Johnstone.

Applications, stating age, date of qualification, experience, &c., should be submitted to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PEMBURY HOSPITAL, Pembury. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer). Post vacant 1st June, 1956. Tenable for 12 months in the first instance and is recognised for the D.A. and the F.F.A.R.C.S. National Health Service scale, less £150 p.a. for board, lodging, &c.

Apply to the Group Secretary, Tunbridge Wells Group Hospital Management Committee, Sherwood Park, Pembury-road, Tunbridge Wells.

POOLE GENERAL HOSPITAL, Longfleet-road, Poole, DORSET. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. 2 HOUSE SURGEONS (pre-registration) required. 1 post vacant immediately, and second on 20th June, 1956. Posts recognised for F.R.C.S. and F.R.C.S.E.

Applications to the Hospital Secretary at the Hospital.

PERTH ROYAL INFIRMARY. Applications are invited for the post of HOUSE PHYSICIAN or SENIOR HOUSE PHYSICIAN (Locum—for June and July) for Geriatric Assessment Unit at Burghmuir Hospital which is attached to Perth Royal Infirmary. Grade according to experience. Junior post is recognised for Pre-registration Hospital Service.

Applications, giving age, qualifications, experience, and the names of 2 referees, should be sent to the Group Medical Superintendent, Perth Royal Infirmary, Perth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICER in Surgery, vacant immediately. Recognised for the F.R.C.S. Greenbank Road Section.

SENIOR HOUSE OFFICER in Surgery, vacant immediately. Recognised for the F.R.C.S. Devonport Section.

SENIOR HOUSE OFFICER in Casualty, vacant 1st July, 1956. Recognised for the F.R.C.S. The Central Casualty Department, South Devon and East Cornwall Hospital, Freedom Fields, Plymouth.

HOUSE SURGEONS (pre-registration posts), vacancies 12th June and 1st July, 1956. Recognised for the F.R.C.S. Greenbank Road Section.

HOUSE SURGEONS (pre-registration posts), 2 vacancies 1st July, 1956. Recognised for the F.R.C.S. Freedom Fields Section.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Queen Alexandra Hospital (87 surgical beds)
HOUSE SURGEON (pre-registration), vacant now.
Queen Alexandra Hospital (78 medical beds)
HOUSE PHYSICIAN (pre-registration), vacant now.
Saint Mary's Hospital (130 surgical beds)
HOUSE SURGEON (pre-registration), vacant 9th May, 1956.
Saint Mary's Hospital
SENIOR HOUSE OFFICER for Pædiatric Department (53 Beds), including oversight of neonatal problems in a large Maternity Department. Vacant 16th May, 1956.
Royal Portsmouth Hospital (Orthopædic Department —104 Beds)
HOUSE OFFICER (pre-registration), vacant now.

Applications, stating age, experience, and qualifications, together with names of 2 referees, should be forwarded as soon as possible to E. H. HURST.
35, Grove-road South, Southsea.

PORTSMOUTH. ST. MARY'S HOSPITAL. Applications are invited for the appointment of SENIOR HOUSE PHYSICIAN at above Hospital. The duties will be mainly in medical wards that form an admission unit for 430 geriatric beds in the Group. A Consultant Physician being in charge of this unit. In addition the successful candidate will have duties in respect of 20 acute medical beds in the Hospital.

Applications, giving age, nationality, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Group Secretary, Portsmouth Group Hospital Management Committee, 35, Grove-road South, Southsea.

READING COMBINED HOSPITALS. Area Department OF OBSTETRICS AND GYNÆCOLOGY. (100 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the resident appointment of GYNÆCOLOGICAL HOUSE SURGEON at the Royal Berkshire Hospital, vacant 1st June and tenable for 6 months. Post recognised for M.R.C.O.G.

Write, stating age and qualifications with dates, nationality, and present appointment, with a copy of 1 recent testimonial, to Secretary.

READING AREA DEPARTMENT OF MEDICINE. Applications are invited from provisionally registered medical practitioners for resident post of HOUSE PHYSICIAN, vacant 1st June, and tenable for 6 months. Successful candidate will be required to carry out duties at following Reading hospitals: Royal Berkshire (399 Beds), Battle (391 Beds), and Prospect Park (104 Beds).

Write, before 19th May, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary, Royal Berkshire Hospital, Reading.

READING. ROYAL BERKSHIRE HOSPITAL. (399 Beds.) Applications are invited from provisionally registered medical practitioners, Male and Female, for resident post of HOUSE SURGEON, vacant 1st June, and tenable for 6 months.

Write, before 19th May, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary.

RYDE. ROYAL I.W. COUNTY HOSPITAL. Isle of Wight GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (salary £745) or HOUSE OFFICER for Pre-registration Service (salary £425–£525 according to experience), required as House Surgeon. Post recognised for F.R.C.S.

Applications, with names of 2 referees, to Hospital Secretary not later than 19th May, 1956.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) Temporary SURGICAL REGISTRAR (Male) required immediately.

Applications should be forwarded to Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER required in the Department of Ophthalmology from 22nd May, 1956.

Applications should be addressed immediately to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit. The service consists of 100 Beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as soon as possible.

RICHMOND, SURREY. ROYAL HOSPITAL. (Acute General Hospital—121 Beds.) Applications are invited for the following posts.

NON-RESIDENT CASUALTY OFFICER (Senior House Officer grade). Post vacant as from 22nd June, 1956.

Pre-registration HOUSE PHYSICIAN. Post vacant as from 1st June, 1956.

Pre-registration HOUSE SURGEON. Post vacant as from 20th June, 1956.

Apply to Administration Officer.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (603 Beds.) Applications are invited from pre-registration candidates for a 6 months appointment of HOUSE SURGEON (recognised for F.R.C.S.) at the above Hospital. Post vacant 1st June, 1956.

Applications, &c., accompanied by 1 testimonial, to reach the undersigned by 18th May, 1956.

J. C. FIELD, Secretary.

RUGBY. HOSPITAL OF ST. CROSS AND ST. MARY'S HOSPITAL, HARBOROUGH MAGNA. SENIOR HOUSE OFFICER in Gynæcology and Obstetrics, vacant 18th May. Obstetrics 40 Beds, gynæcology 12 Beds. Not pre-registration. Resident.

Applications to Hospital Secretary, Hospital of St. Cross, Rugby.

SALISBURY GENERAL HOSPITAL. South West Metropolitan REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of RESIDENT SURGICAL OFFICER (Registrar) at above Hospital. Post vacant 18th July, 1956.

Further details and application forms obtainable from, and should be returned to, Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury, by 15th May.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order from 1st July, 1956, for a period of 6 months in each post. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR in Psychiatry—main duties at Kingseat Hospital which comes under the Board of Management for the Aberdeen Mental Hospitals. Candidates should have experience in their specialty and preferably hold an appropriate higher qualification.

Applications, giving 2 names for reference, should be submitted by 15th May, 1956, to the Secretary, 1, Albyn-place, Aberdeen, from whom further particulars may be obtained.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Anæsthetics. DUNDEE TEACHING HOSPITALS. Applications are invited for a post as SENIOR REGISTRAR in Anæsthetics at the Dundee Teaching Hospitals—Dundee Royal Infirmary (510 Beds) and Maryfield Hospital (360 Beds), the main general teaching hospitals associated with the University of St. Andrews. Salary and conditions of service in accordance with national agreement.

Forms of application and further particulars from the Secretary to the Board, "Bracknowe," 430, Blackness-road, Dundee, with whom applications must be lodged not later than 19th May, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Surgery at the Western General Hospital, Edinburgh, vacant on 2nd September, 1956.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 29th May, 1956.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Radiotherapy based at the Western Infirmary, Glasgow, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 19th May, 1956.

SHEFFIELD, 6. MIDDLEWOOD HOSPITAL. (2000 Beds.) SHEFFIELD NO. 2 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from Male or Female officers for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER at Middlewood Mental Hospital. Furnished flat available. There are good facilities for post-graduate study for the D.P.M. and there is full collaboration with the general hospital situate in the same grounds. Excellent laboratory and other special departments. Extensive psychiatric outpatient service.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, should be forwarded immediately to the Medical Superintendent.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the post of OPHTHALMIC REGISTRAR at the Royal Infirmary.

Applications, with the names of 3 referees, should be sent not later than 16th May, 1956, to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD. CITY GENERAL HOSPITAL. (652 Beds. Recognised for D.Path.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (pathology), required with duties at other hospitals in the Sheffield area. Post vacant 4th July. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 14th May, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHREWSBURY. ROYAL SALOP INFIRMARY. CHILDREN'S UNIT. Locum SENIOR HOUSE OFFICER or HOUSE OFFICER (pædiatric) for the month of June. The Unit consists of medical, surgical, and fever beds.

Apply, in writing, giving full details, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SOUTHAMPTON GENERAL HOSPITAL. (Recognised for the Membership and Diploma Examinations of the R.C.O.G.) RESIDENT HOUSE SURGEON (pre-registration) required mid-June for Gynæcological and Obstetric Unit.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHPORT GENERAL INFIRMARY. (Recognised for F.R.C.S. and pre-registration.) HOUSE SURGEON (general surgery and gynæcology). Post vacant about mid-June.

Apply, with 2 copy testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

ST. ANDREWS. CRAIGTOUN MATERNITY HOSPITAL (41 Beds) AND ASSOCIATED ANTENATAL CLINICS. Applications are invited for the appointment of RESIDENT HOUSE OFFICER at the above Hospital as from 1st July, 1956. The post qualifies for pre-registration.

Apply, with references, to the Medical Superintendent, East Fife Hospitals Board of Management, 243A, High-street, Kirkcaldy.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE SURGEON (House Officer grade) required shortly for general surgical team. (Recognised for F.R.C.S.) Post tenable for 6 months. Preference given to pre-registration candidates seeking posts under the Medical Act, 1950.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. Locum Tenens GYNÆCOLOGICAL AND OBSTETRIC REGISTRAR (resident) required for duties mainly at the above Hospital from 19th May, pending whole-time appointment.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, as soon as possible.

ST. ALBANS CITY HOSPITAL. (384 Beds.) North West METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR required early in June. Duties will be in General Surgical and Orthopædic Departments. Accommodation is available, but post need not be resident. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, Herts, by 15th May, 1956.

STOKE-ON-TRENT, NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER in Orthopædics. Recognised F.R.C.S.

Applications, with names of 2 referees, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (general surgery) required. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. STANFIELD SANATORIUM. (71 Beds—Tuberculosis.) JUNIOR HOSPITAL MEDICAL OFFICER required. Resident.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOCKTON-ON-TEES. SEDGEFIELD GENERAL HOSPITAL, SEDGEFIELD. Applications are invited for the appointment of SENIOR HOUSE OFFICER (orthopædics). Full Consultant staff employed; post recognised in connection with F.R.C.S. examinations; modern self-contained furnished flat available at low rental.

Applications to the undersigned as soon as possible.

L. WATSON, Group Secretary,
Sedgefield Hospital Management Committee.

STOCKTON-ON-TEES. STOCKTON AND THORNABY HOSPITAL. (130 Beds.) TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE OFFICER (surgical) at the above Hospital. The appointment is recognised for Pre-registration Service under the Medical Act, 1950.

Applications, stating full details, and giving 2 names for reference, to be addressed to the Hospital Secretary.

STOCKTON-ON-TEES. THE CHILDREN'S HOSPITAL, Durham-road. (84 Beds.) Applications are invited for the post of HOUSE OFFICER. The appropriate salary and conditions of service being in accordance with the Ministry of Health regulations.

Applications, with copies of 2 recent testimonials, should be forwarded to the undersigned at West Lane Hospital, Middlesbrough, as early as possible.

L. BRITTAIN, Group Secretary,
Cleveland Hospital Management Committee.

STOCKPORT. STEPPING HILL HOSPITAL. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (medicine), vacant 28th May, 1956.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOCKPORT. STEPPING HILL HOSPITAL. (535 Beds.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgery), vacant 30th May, 1956. The post is recognised for the F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, Cheshire.

SULLY HOSPITAL, Sully, Glamorganshire. (Thoracic Centre—324 Beds.) SENIOR HOUSE OFFICER (medical) required to commence as soon as possible. Experience available in investigation and treatment of all lung and heart diseases in adults and children.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SWINDON HOSPITALS. Applications invited for posts of RESIDENT HOUSE PHYSICIANS in Acute Medical Unit of 64 Beds at St. Margaret's Hospital. Recognised for training under pre-registration internship regulations and vacant on 3rd June and 5th July, 1956.

Full details, with names of 3 referees, to Secretary, 7, Okus-road, Swindon, by 18th May, 1956.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for Unit of Obstetrics and Gynæcology, vacant 11th June. Post recognised for M.R.C.O.G.

Applications, stating age, experience and qualifications with dates, with copies of 2 testimonials, to Secretary.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical) Male or Female, required middle June. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 5 Resident House Officers.

Applications, stating qualifications, nationality, and age together with copy testimonials (quoting reference F.955/70), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. SENIOR HOUSE OFFICER required for Orthopædic Department. Salary £745 p.a. Residential accommodation at charge of £155 p.a.

Written applications, giving full details of experience, &c., and 2 names and addresses for reference, to—

W. BOWRING, Group Secretary.

Victoria Chambers, Wood-street, Wakefield.

WAKEFIELD. THE GENERAL HOSPITAL, Park Lodge-lane, WAKEFIELD. (158 Beds.) HOSPITAL MANAGEMENT COMMITTEE NO. 9 WAKEFIELD A GROUP. RESIDENT SURGICAL OFFICER (Senior House Officer grade) required at the above Hospital. Post vacant from 1st May, 1956. Salary and conditions of service in accordance with national recommendations.

Applications should be made to the Group Secretary, 113, Northgate, Wakefield.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited from persons experienced in anæsthetics for the post of RESIDENT ANÆSTHETIST (Male or Female). Graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £745 p.a., less a deduction of £130 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— H. L. BOOT, Group Secretary,

Warrington and District Hospital Management Committee.

c.o General Hospital, Warrington, Lancs.

WEST MALLING, KENT. LEYBOURNE GRANGE COLONY FOR MENTAL DEFECTIVES. (1445 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required at above Colony. Salary scale £775–£50–£1075 a year. Appointment is subject to the terms and conditions of service for medical and dental staffs and is for a period of 3 years in the first instance. Furnished or unfurnished married accommodation available. Ample facilities for study.

Applications, with full details as to age, nationality, qualifications, present post and previous experience, together with names and addresses of 2 referees, to the Group Secretary by 9th May, 1956.

WOLVERHAMPTON GROUP. Royal Hospital. Junior PATHOLOGIST required. Salary in Junior Hospital Medical Officer grade. Comprehensive service offering wide experience and training. Resident post vacant 1st June, 1956. Candidates may visit Pathologist.

Applications by 14th May to Group Secretary, The Royal Hospital, Wolverhampton.

WOODFORD BRIDGE, WOODFORD GREEN, ESSEX. CLAYBURY HOSPITAL (for mental and nervous disorders). Applications are invited for the post of Full-time SENIOR HOUSE OFFICER (resident or non-resident). Board residence for an unmarried applicant, for which a charge of £170 p.a. will be made, is available. The Hospital has over 2000 Beds and an admission-rate of over 1300 a year. All forms of treatment are undertaken and outpatients clinics at general hospitals are run by the Hospital staff. Clinical conferences and seminars for the D.P.M. candidates are held weekly and facilities will be offered to attend lectures in London (1 hours journey). Previous general, but not psychiatric experience necessary.

Applications, with full particulars and the names and addresses of 2 referees, to be sent to the Physician-Superintendent not later than 14 days after the appearance of this advertisement.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR in Psychiatry (resident or non-resident) to assist Consultant Psychiatrist. Main centre—Billinge Hospital. Active Psychiatric Unit. Modern treatment. Over 300 admissions annually. Post recognised for D.P.M. Good training facilities.

Applications, with names of 2 referees, to Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan.

WILLERBY, EAST YORKSHIRE (near Hull). DE LA POLE HOSPITAL. (1174 Beds—mental illness and nervous disorders.) JUNIOR HOSPITAL MEDICAL OFFICER. Hospital has admission-rate of over 850 annually. Modern reception hospital, villas and neurosis unit. All modern methods of treatment practised. The successful candidate will be engaged on work in the admission wards to a considerable extent. Accepted for D.P.M. training. Residential.

Application forms from Group Secretary, Hull B Hospital Management Committee, at the above address.

WORCESTER ROYAL INFIRMARY. (213 Beds.) House SURGEON (pre-registration or otherwise) required.

Applications to the Secretary.

WREXHAM WAR MEMORIAL HOSPITAL. (230 Beds.) WREXHAM, POWYS AND MAWDDACH HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident) for the Casualty Orthopædic Department of the above Hospital. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.), and is subject to a limited tenure of 2 years, which may be reviewed at the end of that period. Salary £775–£50–£1075 p.a. Whitley Council conditions of service.

Applications, giving details of age, qualifications, and previous experience, together with copies of 2 recent testimonials, should be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR in Psychiatry, based Pen-y-Val Hospital, Abergavenny, Mon. Full range of modern psychiatric treatments and a number of associated general hospital outpatient clinics. Resident. Married or single quarters available.

REGISTRAR (pædiatrics), based Merthyr General Hospital, Merthyr, to serve Merthyr and Aberdare Hospital Management Committee.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

BELFAST. MATER INFIRMORUM HOSPITAL. (General Teaching Hospital.) SENIOR HOUSE OFFICER. Salary at rate of £745 p.a., less a deduction of £150 for residential emoluments.

Apply, with copies of 2 recent testimonials, to the Honorary Secretary, Board of Management, Mater Infirmorum Hospital, Belfast.

CHANNEL ISLANDS, JERSEY. GENERAL HOSPITAL. Applications are invited for the post of RESIDENT SURGICAL OFFICER at the above Hospital. Previous experience is essential. The Hospital has 200 Beds and is recognised as a training hospital for the F.R.C.S. Post is vacant on 16th June, 1956. The appointment is for 6 months in the first instance, but is renewable for a further 6 months. Salary £850 p.a., less £125 for residential emoluments.

Applications to be submitted not later than 17th May, 1956, to the President, Public Health Committee, General Hospital, Jersey, C.I.

CANADA. OTTAWA GENERAL HOSPITAL, Ottawa, ONTARIO. RESIDENCIES vacant—Psychiatry. Active treatment department of 600-beds general hospital. Organised training approved by Royal College. $1800 p.a. and full maintenance.

Apply to Sister Superior.

U.S.A. ST. ELIZABETH HOSPITAL, Covington, KENTUCKY. (400-Bed Hospital.) Required, INTERNES. Internship approved by American Medical Association. Rotate through services in Surgery, Medicine, Pediatrics, Obstetrics, and Emergency Room. Starts 1st July, 1956, and ends 30th June, 1957. Salary $200 per month with maintenance.

Contact above Hospital.

Public Appointments

BIRMINGHAM. CITY OF BIRMINGHAM. Public HEALTH DEPARTMENT. Whole-time ASSISTANT MEDICAL OFFICER (Male or Female) for maternity and child welfare. Applicants should have had experience in work with mothers and children, including a 6 months resident post in a maternity hospital and in a children's hospital. The D.P.H. will be considered an additional qualification. The duties will be mainly in connection with maternity and child welfare as well as the medical aspects of the care of deprived children. Salary £975–£50–£1375 p.a. according to qualifications and experience. Pension scheme (including Widows and Orphans); medical examination.

Form obtainable from Medical Officer of Health, Council House, Birmingham, 3. Applications with 3 recent testimonials to be returned by 20th May, 1956.

DURHAM COUNTY COUNCIL. Health Department. ASSISTANT MATERNITY AND CHILD WELFARE MEDICAL OFFICER. Applications are invited from registered medical practitioners (Female). Commencing salary £975 p.a., rising by annual increments of £50 to £1375 p.a. Travelling expenses will be paid in accordance with Whitley Council scale.

The appointment is subject to certain conditions, particulars of which may be obtained from the County Medical Officer of Health, Shire Hall, Durham, to whom applications, together with the names of not more than 3 referees, should be sent not later than 21st May, 1956.

J. K. HOPE, Clerk of the County Council.

BARBADOS GENERAL HOSPITAL. **Medical Officers** are required at the General Hospital, Barbados, to undertake duties ordinarily performed in a large acute general hospital of 500 Beds, including medical, surgical, obstetrics, theatre and ward work, anæsthetics, casualties and outpatients and any other departmental duties as may be directed. Candidates must possess qualifications registrable in the United Kingdom. Appointments will be on agreement for 3 years; or (if the officer is a bachelor) on 1 year agreement, renewable—with return passage. Salary scale is $3720–$4920 (£775–£1025) a year, starting salary depending upon candidate's age and experience. A temporary cost-of-living allowance of $156 (£32 10s.) a year is also payable. The Government of Barbados would pay employer's share of contributions to an approved superannuation scheme during period of Officer's service there. Free quarters are provided and furniture, linen, cutlery and crockery. Free passages to Barbados are provided for the Officer, wife, and children on first appointment and back to the United Kingdom on the satisfactory completion of the agreement, subject to a total maximum cost of $1440 (£300) each way. Income-tax at local rates. Social and recreational amenities are good. Climate is healthy. Educational facilities are available.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/28/02).

BRITISH RAILWAYS. **Eastern Region.** **Applications** are invited from registered medical practitioners, preferably under 40 years of age, for appointment as an ASSISTANT MEDICAL OFFICER in the Eastern Region, British Railways. Candidates should have a good clinical background and an interest in Industrial Medicine. Experience in general practice is desirable. Salary on appointment £1325 p.a., and membership of the Superannuation Fund, subject to medical examination, obligatory. The successful applicant is likely to be located at Doncaster and will be required to travel throughout the Region for relief purposes.

Applications, giving full particulars of age, qualifications and experience, and 2 references, should be sent to the Regional Medical Officer, Eastern Region, General Offices, Marylebone Station, N.W.1, not later than 19th May, 1956.

COMMONWEALTH OF AUSTRALIA. **Department of HEALTH.** Applications are invited for the position of DIRECTOR, Commonwealth Serum Laboratories, Melbourne, Victoria.

Salary: £4450 (Aust.) p.a.

Duties: Direct all aspects of the activities of the Commonwealth Serum Laboratories, Melbourne, which covers the production of a wide range of sera, vaccines, antibiotics and biological products.

Qualifications: Applicants should be eligible for registration as a medical practitioner in Australia and for preference possess additional appropriate scientific qualifications at degree level. Qualifications and experience in management and in the large scale production of biologicals and antibiotics should be stated, together with postgraduate training and experience.

Applications, stating name in full, date of birth, qualifications, marital status, to the Official Secretary, Office of the High Commissioner for Australia, Strand, London, W.C.2, by 24th May, 1956.

DUBLIN. **LOCAL APPOINTMENTS COMMISSION.** Position vacant. MEDICAL SUPERINTENDENT, Ardkeen Chest Hospital, co. Waterford. Salary scale £1465–£1675.

Application forms and particulars from the Secretary of the Commission, 45, Upper O'Connell-street, Dublin. Latest time for receiving completed application forms 5 P.M. on 18th May, 1956.

NORFOLK. **COUNTY OF NORFOLK.** **The Norfolk** County Council and the County District Councils concerned invite applications from registered medical practitioners holding the Diploma in Public Health for the whole-time appointment of ASSISTANT COUNTY MEDICAL OFFICER AND DISTRICT MEDICAL OFFICER OF HEALTH for the undermentioned area:—

Area No. 8.—Docking Rural District; Walsingham Rural District; Wells-next-the-Sea Urban District; Hunstanton Urban District (as A.C.M.O. only). Total population approximately 48,000.

The person appointed will be employed for seven-elevenths of his time as Assistant County Medical Officer and four-elevenths as District Medical Officer of Health. He will act as an Assistant County Medical Officer under the direction of the County Medical Officer, and as District Medical Officer of Health he will be subject to the instructions of the District Councils concerned. The combined salary scale will be £1536, rising to a maximum of £1794 p.a. Travelling and subsistence expenses will be paid in accordance with the County Council's scales.

Application forms, together with further particulars of the appointment, can be obtained from the County Medical Officer, 29, Thorpe-road, Norwich, to whom completed application forms should be returned not later than 31st May.

NORTHAMPTONSHIRE COUNTY COUNCIL. **Applications** are invited for the whole-time appointment of ASSISTANT MEDICAL OFFICER for maternity and child welfare and school medical inspection, on the salary scale of £975–£50–£1375 p.a., subject to the increase recently agreed by the Medical Whitley Council. Travelling and subsistence allowance will be paid on the scale from time to time approved by the Council. Preference will be given to candidates who have special experience in maternity and child welfare work or who hold the Diploma in Child Health. The Officer appointed will work under the direction of the County Medical Officer of Health and will have to reside in or near Kettering. The appointment will be subject to the Local Government Superannuation Acts and will be determinable by 3 months notice on either side.

Applications, stating age, qualifications and experience, with the names of 2 referees, should reach the undersigned not later than 19th May, 1956.

J. ALAN TURNER, Clerk of the County Council.
County Hall, Northampton.

FACTORY DOCTORS. **Factories Acts, 1937 and 1948.** The following appointments as Appointed Factory Doctor are vacant. Apply to Chief Inspector of Factories, 8, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
TAIN	ROSS-AND-CROMARTY ..	26TH MAY, 1956
WIVELISCOMBE ..	SOMERSET	26TH MAY, 1956

GOLD COAST LOCAL CIVIL SERVICE. **Gold Coast** MEDICAL SERVICE. Applications are invited from doctors with registrable qualifications for the following posts in the Gold Coast Local Civil Service:—

(1) MEDICAL OFFICERS for general duties including hospital and district work.

(2) MEDICAL OFFICERS OF HEALTH to prevent disease and to carry out treatment whenever necessary. Candidates must possess in addition to registrable qualifications the Diploma of Public Health or a similar recognised qualification.

Appointment may be as follows:—

(*a*) Contract for 2 tours of duty of 18–24 months with gratuity (taxable) at the rate of £12 10s. for each completed month of service. Salary in the scale £1330–£2310 a year.

(*b*) On 3-years probation for permanent and pensionable employment. Pension (non-contributory) is earned at the rate of 1/600th of the final pensionable emoluments for each completed month of service. Salary in the scale £1055–£1850 a year.

(*c*) Doctors in the National Health Service may leave the National Health Service but retain their superannuation rights while in the Gold Coast (up to 6 years) and receive a gratuity (taxable) of 20% of their Gold Coast salary after their engagement. Salary in the scale £1055–£1850 a year.

Starting point in salary scales is determined according to qualifications and experience.

Quarters are provided at rental not exceeding £150 a year. Income-tax at local rates. Free passages provided for Officer, wife, and up to 3 children under 13 years of age. Annual local leave is permissible and generous home leave is granted after each tour.

Application forms can be obtained from the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/13/04).

TREASURY MEDICAL SERVICE. **Applications are** invited from medical practitioners, practising in the districts detailed below, for appointment, in a part-time and mainly advisory capacity, as LOCAL TREASURY MEDICAL OFFICER for each of the places or groups of places shown. The town shown in brackets after the place-names indicates the Head Post Office Area in which the place, or group of places, is situated. Successful applicants will be required to examine and report on the condition of certain Government Officers, teachers, candidates for appointment, &c., who may be referred to them from time to time; and to attend when summoned to an emergency case of accident or sudden illness occurring in a Government office in the neighbourhood. Fees for this work, and mileage allowance where necessary, will be paid on a scale agreed with the British Medical Association.

Intending applicants should write, within 14 days, to Treasury Medical Adviser, Treasury Chambers, Whitehall, S.W.1, for a form on which application may be made. Applicants should be not more than 60 years of age.

The places for which applications are invited are as follows:—

ENGLAND AND WALES

Ashtead (Epsom).
Anerley (London, S.E.20).
Norwood (London, S.E.19).
Redruth and Stithians (Redruth).
Milverton and Wiveliscombe (Taunton).

SCOTLAND

Glasgow, S.2 (Glasgow).
Auchenblae and Fordoun (Montrose).
Innerleithen (Peebles).

NORTHERN IRELAND

Newcastle and Dundrum (Banbridge).

WESTERN REGION OF NIGERIA. **A Specialist Radiologist** is required for the Medical Department of Western Nigeria to give advice on radiological equipment of hospitals in the Region, to advise and assist medical officers in the interpretation of X-ray films, to travel in the Region supervising the work of X-ray technicians and radiographers, and to be responsible for the ordering and supplying of departmental X-ray stores. Candidates should possess registrable medical qualifications and the D.M.R.D. plus 4 years experience in their specialty.

Appointment may be made as follows:—

(*a*) From the National Health Service. A candidate may leave the National Health Service but retain his superannuation rights up to 6 years and receive a gratuity (taxable) of 20% of the aggregate of his salary after his engagement; or

(*b*) On short-term contract (1 tour in the first instance of 12–24 months duration according to age).

Salary for officer appointed under (*a*) is £2220 a year, and an officer appointed under (*b*) receives a somewhat higher salary and a gratuity (taxable) on satisfactory completion of contract. This gratuity is at the rate of £37 10s. for each completed period of 3 months service (including leave).

Officer appointed under (*b*) is required to contribute to a Widows' and Orphans' Pension Scheme.

Quarters provided at rental of £150 a year. Taxes at local rates. Annual leave permissible: generous home leave granted after each tour of 12–24 months. Free passages for Officer on first appointment, on duty and on leave, and free return passages for Officer's wife in each tour of service. Generous allowances also given for return passages of Officer's children.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/410/04).

WINDWARD ISLANDS. Medical Department. Resident MEDICAL OFFICER required in Grenada as House Officer in the Colony Hospital for general duties under the Physician and Surgeon Specialist. Candidates may be asked to transfer to any medical post of equivalent status anywhere in the Windward Islands. Appointment may be made either on a permanent basis with pension (non-contributory) at the age of 55, or on short-term agreement (3 years). Salary scale ranges from £800 to £1000 a year. Pension is earned at the rate of 1/600th of final pensionable emoluments for each completed month of service. Private practice is permitted so long as this does not interfere with the proper performance of the officer's duties. If, by reason of his duties, a medical officer is not allowed private practice, he will be paid a non-pensionable allowance of £100 a year in lieu. Should a medical officer hold a specialist qualification, and is required to make use of that qualification, a non-pensionable allowance of £100 a year is payable. Income-tax at local rates. Unfurnished quarters provided at a rental not exceeding 10% of salary. Free passages provided on appointment for Officer and family, not exceeding 5 persons in all. Leave passages may be provided for Officer and wife once every 5 years. Generous home leave granted after each tour.

Application forms from the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/41/01).

YORKSHIRE. DIVISIONAL ADMINISTRATION OF THE PREVENTIVE MEDICAL SERVICE IN THE ADMINISTRATIVE COUNTY OF THE WEST RIDING OF YORKSHIRE. PUBLIC HEALTH DIVISION NO. 30. Appointment of MEDICAL OFFICER OF HEALTH to the Conisbrough, Dearne and Mexborough Urban District Councils and DIVISIGNAL MEDICAL OFFICER to the West Riding County Council. Applications are invited from registered medical practitioners who must also be registered in the Medical Register as the holder of a Diploma of Sanitary Science, Public Health, or State Medicine, for the above-mentioned whole-time appointment. The effect of the "mixed" appointment will be to secure that the planning of the day-to-day administration and the execution of all or practically all public health matters of the division will be in the hands of 1 person, the Divisional Medical Officer of Health. A Divisional Public Health Office with necessary staff will be provided in Mexborough.

The salary attached to the post is as follows :—

(*a*) For Medical Officer of Health duties £965–£26 5s. (4) to £1070 p.a.

(*b*) For County Council duties £915 12s. 6d.–£31 5s. (7)–£40 12s. 6d. (1)–£1175 p.a.

In addition, there will be a travelling and subsistence allowance at the rate of £120 p.a.

The appointment will be made jointly by the District Councils and the County Council and the person appointed will not be permitted to engage in private practice.

The successful candidate will be required :—

(*a*) To reside within the division or within such distance therefrom as may be approved.

(*b*) As Medical Officer of Health of the Urban Districts of Conisbrough, Dearne and Mexborough to act under the control and direction of the respective district councils, and to perform all the duties imposed on a Medical Officer of Health by the relevant Acts and Orders.

(*c*) As Divisional Medical Officer, to act as administrative officer for the County Council's services in the same district for which he is Medical Officer of Health under the general supervision and control of the County Medical Officer.

(*d*) To undertake such other duties not being incompatible with the above as the Councils may jointly decide upon.

(*e*) The appointment is superannuable and the successful candidate will be required to pass a medical examination as to his physical fitness.

Forms of application and terms and conditions of service may be obtained from the County Medical Officer, County Hall, Wakefield, to whom completed forms must be returned not later than 28th May, 1956. Canvassing of members of the appointing bodies directly or indirectly will disqualify any candidate for the post.

R. F. EDWARDSON,
Clerk to the Conisbrough Urban District Council.

C. BISHOP,
Clerk to the Dearne Urban District Council.

S. H. E. CRANE,
Clerk to the Mexborough Urban District Council.

J. WOOD-WILSON,
County Medical Officer.

PSYCHIATRISTS

required immediately at the
Hospitals for Mental Diseases located at
BRANDON and SELKIRK
MANITOBA—CANADA

Psychiatrists required immediately at the Hospitals for Mental Diseases located at Brandon and Selkirk, Manitoba, Canada. Salaries range from $5040 without previous graduate experience, to a maximum of $8040 p.a. and are subject to a deduction of $100 per month for furnished house or suite plus full maintenance for doctor and his family.

Passage money may be advanced if required, to be partially recovered by monthly pay deductions. Applicants must be graduates of British Medical Schools and have a year of General Hospital experience. Credit will be given for additional experience in general or psychiatric practice.

Applications, with full particulars and the names of 2 referees, may be addressed to the PROVINCIAL PSYCHIATRIST, Psychopathic Hospital, Winnipeg, Manitoba, from whom full details may be obtained.

NATIONAL COAL BOARD. Durham Division. Applications are invited from registered medical practitioners for the appointment of ASSISTANT AREA MEDICAL OFFICER, No. 4 Area (South West Durham). The successful applicant will be required to live within the Area. He should preferably be around 30 years of age and be prepared to make frequent visits underground. The duties include all aspects of industrial medicine. Salary, according to qualifications and experience, will be within the £1100–£1600 range. Candidates with a fair amount of postgraduate experience will not be paid less than £1200. Medical examination is necessary as the successful candidate must be eligible for membership of the Board's principal superannuation scheme to which he will contribute.

Applications, giving date of birth, qualifications, and experience in chronological order, and naming 2 referees, should be sent within 14 days to Divisional Establishments Officer, "D" Floor, Milburn House, Newcastle upon Tyne. 1.

Hospital Services : Non-Medical Appointments

CHESTER BEATTY RESEARCH INSTITUTE, Institute OF CANCER RESEARCH : ROYAL CANCER HOSPITAL, Fulham-road, S.W.3. SENIOR TECHNICIAN (grade II) required, with experience and training in histology. A basic knowledge of haematology and bacteriology, although not essential, would be regarded as an asset. A qualification of the Institute of Medical Laboratory Technicians would also be an asset but is not essential. The post is superannuable and the salary will be in accordance with the new Whitley Council scales.

Applications, marked "Histology" and including the names of 2 referees, should be sent to the Secretary, not later than 31st May, 1956.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. Bio-CHEMIST required, preferably having Honours B.Sc. Basic grade. Salary and conditions in accordance with Whitley Council recommendations.

Detailed applications to Secretary.

Miscellaneous

To non-professional posts the Notification of Vacancies Order 1952 applies

The Withymead Centre, Countess Wear, Exeter, Devon. Applications are invited for the post of Resident Medical Psychotherapist (Woman). Salary not less than £650, less £150 for board and lodging. The Centre is established by Deed of Trust. It is run on community lines and is engaged in pioneering work based on the psychology of C. G. Jung. Reference may be made to Dr. Joyce Partridge or Dr. H. G. Gaussen, both of Exeter.

Applications to Secretary.

Medical Officer required urgently. Exclusive service large firm, Uganda. Preferably Diploma Tropical Medicine and/or Pathology. Minimum qualification registered U.K. for practising medicine surgery.—Details : GUNDLE, 2, Ellerdale-road, London, N.W.3.

North Kensington Marriage Welfare Centre require a medically qualified Assistant (Male) for their Consultant in sexual problems for a session on Monday evening, 5–7.30 P.M. Fee 2½ guineas per session.—Applications in writing to Secretary, 12, Telford-road, W.10.

The British Columbia Cancer Institute, 2656 Heather-street, Vancouver 9, British Columbia, Canada, requires a fully-trained Radiotherapist.—For further information, apply to the Director.

Harley-street consulting-room, furnished. £300, year. 5 daily sessions per week.—Address, No. 219, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Electronics applied to Medicine. Specialist electronic engineers are available for the design, development, and production of all forms of electronic equipment for research and diagnosis.—CHAPMAN, Riley Works, Riley-street, S.W.10.

E.C.T. Apparatus for Sale. Strauss-McPhail. Bought 1946, little used, excellent condition. Available approval in S.W. area. What offers ?—Address, No. 218, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

Typewriting and Duplicating. First-class work at moder-ate prices by experienced medical typists. Electric machines. —SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329 0504).

New Austin Cars from £270 13s. 6d. down, 24 payments £13 4s. 4d.—SAUNDERS, Austin House, 140, Golders Green-road, Golders Green, London, N.W.11.

Professional, technical and personal typewriting. Duplicating, circularising, &c., efficiently and speedily executed.—"MOWBRAY," 146, Bishopsgate, E.C.2 (BIS. 2545, BAR. 7665).

Dr. Strathmann, Physician, of Hamburg, Bei der Apostel-kirche 20, would like his 15-year-old son to stay as guest with an English family from about 2nd July till 18th August of this year. He will in return be host to an English boy of about the same age for a like period next year. References given and required.

University of Hong Kong Library, Hong Kong, B.C.C. urgently requires the following Lancet Indexes only. Offers to Librarian for gift or purchase. 1946 v.2 ; 1947 v.1 and 2 ; 1948 v.1 and 2 ; 1949 v.1 ; 1950 v.2 ; 1951 v.1 and 2 ; 1952 v.1 and 2 ; 1953 v.1 and 2.

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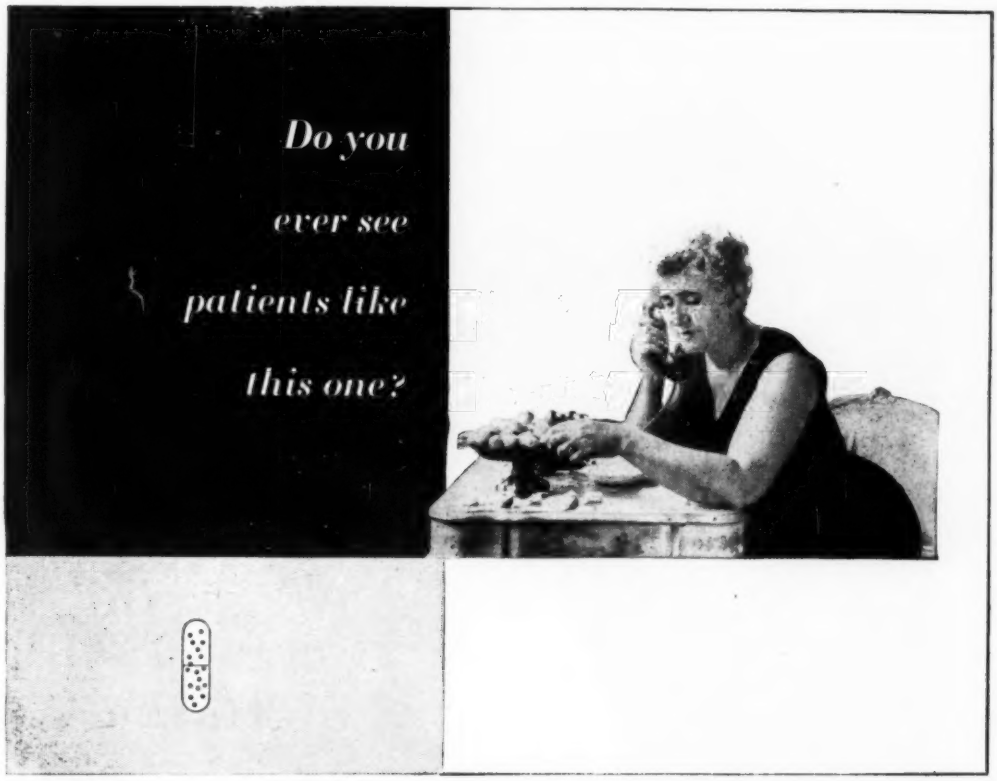

Grace has two married children. After years of fussing over them she is left with comparatively little to do or think about. A succession of between-meal snacks garnish her day like slices of lemon down the back of a cold salmon. Her weight increases slowly but steadily.

You can help patients of this type with 'Dexedrine Spansule' capsules. One 'Dexedrine Spansule' capsule, taken in the morning, controls appetite all day long, *between meals*, as well as at mealtimes . . . helping to eliminate the succession of sweets and snacks that contribute so heavily to weight gain.

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but when pollens are a problem

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